US Army Corps
of Engineers®
Seattle District

Notice of Preparation

Planning and Project Management Division
Environmental Management Branch
P.O. Box 3755
Seattle, WA 98124-3755
ATTN: Jeffrey F. Dillon (PM-PL-ER)

Public Notice Date: 14 May 2009
Expiration Date: 29 May 2009
Reference: PL-09-03

Name: Ferndale, Guide Meridian, River Road and Hovander Levee Repairs

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Interested parties are hereby notified that the U.S. Army Corps of Engineers, Seattle District (Corps) plans to prepare, pursuant to the National Environmental Policy Act (NEPA), an environmental assessment (EA) for proposed levee repairs on the Nooksack River at the Ferndale, Guide Meridian, River Road and Hovander levees, Whatcom County, Washington. Repairs are intended to address damage caused during flooding.

AUTHORITY
The Corps of Engineers is undertaking these repairs under its Public Law (PL) 84-99 emergency response and assistance authority. The City of Ferndale (Ferndale Levee) and Whatcom County Flood Control Zone District (all others) are the local sponsors for these projects.

BACKGROUND
Between 7 and 10 January 2009, heavy rains and warm winds of subtropical origin, antecedent low elevation snow and ice, and a series of high tides contributed to moderate to severe flooding in the Nooksack River valley, with damages from the headwaters to the river delta. A 15-year flood event occurred at the Cedarville gage, which increased in magnitude in the downstream direction until reaching a 27-year recurrence interval at the City of Ferndale. Erosion and levee damage from this flooding occurred at the Hovander Levee (RM 3.5); Ferndale Levee (RM 5.5); River Road Levee (RM 13.5) and Guide Meridian Levee (RM 16.3).

NEED
Ferndale Levee: At the Ferndale site, high velocity flows caused scour to the heavily vegetated and oversteepened waterward slope. Two adjacent sites on this levee were damaged by toe scour and seepage over an 860 feet reach. In the current damaged condition, the levee is estimated to offer a 10-year level of protection. Prior to the flood this levee offered a 30-year level of protection.

Guide Meridian Levee: At the Guide-Meridian site, high-velocity flows caused damage in three locations. In the current damaged condition, the levee offers a two-year level of protection; a two-year flood could breach the already damaged levee and flood onto the extremely low

floodplain. Flood damages at Site 1 consist of a breach 200 feet long that was filled during a flood fight. Site 2 damages are comprised of 250 LF area of toe scour and slope loss. Site 3 damages consist of 250 LF of back slope overtopping scour damage. Prior to the flood this levee offered a 5-year level of protection.

Hovander Levee: High flows during the January 2009 flood event caused damage in two general locations. Damage at Site 1 consists of approximately 200 LF of toe and slope scour, back slope scour and loss of embankment from levee overtopping. Scour in some locations has removed half of the riverward levee prism. Damage at Site 2 is along the downstream 2400 LF section which experienced backslope scouring from river overtopping in six (6) locations totaling 700 LF in lengths varying from 60 – 240 LF. In the current condition, the levee offers a one (1) year flood protection. Prior to the flood this levee offered a 15-year level of protection.

River Road: The January 2009 flood event overtopped the levee resulting in a 200 foot breach, backslope scour and severe piping between RM 14.25 and RM 15. Damage is concentrated at three locations, each approximately 400 LF. One 400 LF stretch includes a 200 LF breach, which was temporarily repaired by the Corps during a flood fight. In the current condition, the levee offers an estimated 2-year level of flood protection. Prior to the flood this levee offered a 20-year level of protection.

PURPOSE

The purpose of the project is to repair and return the damaged levees to the level of flood protection found prior to the January 2009 flood event in order to protect lives and property from subsequent flooding.

PROPOSED ACTION

Multiple alternatives would be considered as follows.

- No Action. No levee repairs would be done. Further damage during floods is possible, putting infrastructure and homes at risk.

- Setback Levee. This alternative is currently the preferred alternative for the Hovander Levee.
    - Hovander Levee: The preferred alternative is to construct 940 LF of setback levee and intermittent backslope erosion repair along 2400 LF of existing levee. The recommended plan at Site 1 consists of realigning the levee landward behind the existing levee and installing a rock toe trench along the first 300 LF of its new alignment. The existing damaged levee section would be regraded to 6H:1V slope, planted and hydro seeded with native grasses to accelerate stabilization of the existing river bank in this location. Excavated material would be utilized to rebuild the setback levee as much as possible. Additional granular fill material would be imported. The new levee section would have a 3H:1V riverward face and a 5H:1V back slope with a 12 foot top width. Repairs at the downstream site (Site 2) would consist of back slope filling and re-grading of known damage for a total of 700 LF in six different locations. Each site would be regraded and new granular fill material would be placed to re-establish the pre-flood conditions.

- Replace In Kind. This alternative is currently the preferred alternative for the Ferndale, Guide-Meridian and River Road Levees.
    - Ferndale: Ferndale repairs will occur at two sites. Site 1 repairs consist of rebuilding and replacing the missing toe material along a 450 LF reach with class V riprap on a

1.5:1 slope. The site will be accessed from the bench upstream of the damaged area. An access ramp will be constructed. It is anticipated that approximately 4 to 6 mature trees will be removed to access the toe. In addition, invasive vegetation will be removed as part of the construction within the construction footprint. Rock will be installed ahead of the equipment to establish a 6-foot high by12-foot wide toe structure, and will support the equipment as construction proceeds downstream. Upon completion of the project, the access ramp will be removed and the bench will be planted with native species and all disturbed areas will be hydroseeded with native grasses. Site 2 repairs include placement of additional material along 410 LF of the levee backslope to eliminate seepage. The backslope will be reestablished at 2H:1V except for two 6 foot wide locations, which will be sloped at 4H:1V to allow for pedestrian access. All disturbed areas will be hydroseeded with native grasses at the conclusion of construction.

- Guide-Meridian: Site 1 repairs would consist of adding topsoil and hydroseeding. Site 2 repairs entail constructing a new 2H:1V riprap toe and armoring with a 4-foot blanket of riprap to an elevation 5 feet vertically above OHW to replace the missing scoured materials. The construction would require excavating and pulling back the existing bank to accommodate new materials without extending the toe structure beyond the current bankline. The riverward edge of the levee top would be pulled landward 18 feet, allowing for a new riverward bank with a 2H:1V slope. Material excavated from the levee top landward would be used to create a more gradual backslope. The upper 1/3 would not be riprapped. Ten 15- to 18-inch diameter logs would be installed in the toe and weighted with armor rock, with rootwads in the river as fish habitat. Native willow planting would occur in the upper 1/3 of the riverward slope along the entire 250 LF. Access to the levee would be along the levee crown and/or along the landward toe. Construction would occur within the established fish window (June 15-August 31). Site 3 repairs consist of back slope filling and re-grading for 250 LF; this work would be completed by the Sponsor. All disturbed areas would be hydroseeded after construction.

- River Road: Repairs would consist of reconstructing the levee prism at three 400 LF damage sites for a total repair length of approximately 1,200 feet. The first repair (Section A) would include removing existing armor rock, placing and compacting imported levee fill material within the original footprint, and placing a six inch gravel lift on the crown. No trees would be removed repairing this section. The second repair (Section B) would include excavating a 400 LF reach to grade, reworking the excavated material with imported material, and reconstructing the levee prism in compacted lifts on the original footprint. A six inch gravel lift would be placed on the crown. No trees would be removed repairing this section. The third repair (Section C) would include pulling back (landward) the crown of a 400 LF section of over-steepened embankment and placing the flood repair rock from Section A on the riverward embankment. All levee embankments would be graded 2H:1V. All disturbed areas would be hydroseeded with native seed upon completion. Ten to fifteen small trees would be removed to complete the repair of Section C.

- Hovander: There are sections of overtopping and minor backslope scour that need to be repaired at several sites on the existing levee downstream of the intended setback portion. These (Site 2) repairs would consist of backslope filling and re-grading along 2400 LF of levee for a total of 700 LF in six different locations.

- Nonstructural. This alternative would relocate all existing structures, utilities and other infrastructure within the damage area protected by this section of levee.

Final selection of the preferred alternative and finalization of the design, including mitigation, would occur during the NEPA process and before construction.

ANTICIPATED IMPACTS
Impacts anticipated at this point are as follows.

Wetlands. The proposed relocations of the Hovander levee is anticipated to impact wetlands as they are known to be present at this site. To relocate the levee, small scale losses of wetlands would occur adjacent to or under the proposed levee footprint. These losses are unavoidable consequences of the setback alternative. The impacts are required in order to improve the overall productivity and wetland function at the Hovander location. The wetland impacts are considered self-mitigating as they are necessary for the improvement to wetland and floodplain function at the project site resulting in higher productivity than the pre-project condition. Setting back the Hovander levee will provide the Nooksack River with approximately 3.8 acres of additional floodplain. The downstream levee portion (Site 2) is in a swamp. It is to be repaired in kind, and will not involve any work or equipment outside the existing levee footprint.

Wetlands are not present at the footprint of Ferndale, Guide-Meridian or River Road project sites. There are no anticipated impacts to wetlands at these three sites.

Biological Resources. The Nooksack River is home to several species of salmonid fish, including coho, pink, chum and Chinook salmon, as well as steelhead and bull trout. Various types of birds and mammals may be found in the area, including geese, ducks, swans, raccoon, and otter. The project is expected to cause temporary disruptions to nearby fish and wildlife as a result of noise and vibration. In water portion of repairs at Ferndale, Guide-Meridian and River Road levees would be done in the approved in-water work window of June 15-August 31, to minimize impacts to salmon and steelhead. Removal of riparian vegetation would result in loss of shade and cooling, overhead cover, and deposition of nutrients, organic material and insects which serve as food for fish. New vegetation would be planted at the Ferndale, Guide-Meridian and River Road sites. At the Hovander site, removal of riverward vegetation is not anticipated. Even with replantings, it would take several years for willows to reach a height to provide effective shading. Impacts from the proposed repairs represent both short and long term beneficial impacts such as at the Hovander levee site. Varying degrees of short term negative impacts to fish and wildlife are anticipated at the River Road site and both short and long term impacts are anticipated at the Ferndale and Guide-Meridian sites. None of these impacts, individually or collectively, are anticipated to have significant impacts to the environment.

The following table lists threatened and endangered species potentially occurring in the project vicinity.

Species	**Listing Status**	**Critical Habitat**
Puget Sound Steelhead *Oncorhynchus mykiss*	Threatened	Not yet designated
Coastal/Puget Sound Bull Trout *Salvelinus confluentus*	Threatened	Designated, includes action area
Puget Sound Chinook Salmon *Oncorhynchus tshawytscha*	Threatened	Designated, includes action area

Marbled Murrelet *Brachyramphus marmoratus*	Threatened	Designated, does not include project area
Northern Spotted Owl *Strix occidentalis*	Threatened	Designated, does not include project area
Grizzly Bear *Ursus arctos horribilis*	Threatened	—
Gray Wolf *Canus lupus*	Threatened	Designated, does not include project area
Canada lynx *Lynx canadensis*	Threatened	—

A biological assessment is being prepared pursuant to Sec. 7 of the Endangered Species Act to determine whether the proposed actions are likely to adversely affect these species or their designated critical habitat. However, no effect is expected to grizzly bear, gray wolf or Canada lynx, marbled murrelet or spotted owl because of specialized habitat requirements, intolerance to the level of human activity at these sites, or both.

Water Quality. Potential effects to water quality include a small incremental effect of loss of shading, which might contribute to warming in summer and add to stress in fish. It is possible with or without rain that suspended solids may enter into waters and temporarily cause increases in turbidity; but, use of clean rock and other best management practices, ensure such impacts are minimal and dissipate quickly. Long term benefits are also anticipated through setback alignments which provide opportunity for mature riparian forest and wetlands development.

Cultural Resources. Prior to repairs, a Corps archeologist would conduct a cultural resources survey of the project area to determine whether there is a potential for the proposed repairs to cause effects to historic properties. National Historic Preservation Act Section 106 compliance reports would be prepared for all proposed 2009 levee repairs. The report would include the findings of the investigations for each repair site, recommendations for archaeological monitoring during construction, and a determination of effects to archaeological and historic properties. If archaeological monitoring is recommended at some repair locations, the report would include a monitoring plan and protocols to be followed. The protocols would include an inadvertent discovery clause that would apply when an archaeological monitor is not present. The Corps' determinations of effects to historic properties, the investigation report, and monitoring plan would be reviewed and approved by the Washington State Historic Preservation Officer (SHPO) and the appropriate tribes prior to construction.

Air Quality. Construction vehicles and heavy equipment would temporarily and locally generate gasoline and diesel exhaust fumes, carbon dioxide (CO_2), carbon monoxide, and dust on roadways. These emissions would not exceed the Environmental Protection Agency's (EPA) *de minimis* threshold levels (100 tons/year for carbon monoxide and 50 tons/year for ozone) or affect the implementation of Washington's Clean Air Act implementation plan. Unquantifiable but insignificant exacerbation of effects of CO_2 emissions on global climate change is also anticipated.

Noise. Temporary increases in noise would occur as a result of rock delivery and placement. The sites are located near residential and agricultural properties. Work would be done during daylight hours to minimize the adverse effects of noise on businesses and residents.

Traffic. Construction-related traffic would cause minor temporary increases to, and disruption of, local traffic. Efforts would be made to minimize disturbances to traffic patterns during construction through appropriate work hours, signage and notifications and proper traffic controls.

Cumulative Effects. The repairs would return the levees to their pre-flood level of protection. Development within the Nooksack valley would continue. Development could possibly be fostered by the presence of these levees, which would mean further long-term environmental degradation. The setback at Hovander levee may reduce future development between the setback and the original alignment.

COMPLIANCE WITH OTHER LAWS AND REGULATIONS

The Corps will coordinate the proposed action with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service concerning anticipated effects on threatened and endangered species and their critical habitat, pursuant to Sec. 7(a)(2) of the Endangered Species Act. A biological assessment is being prepared, based on a preliminary determination that these projects are likely to adversely affect threatened Puget Sound Chinook salmon, Puget Sound steelhead, Coastal/Puget Sound bull trout and their designated critical habitat.

An evaluation will be made concerning whether the projects are anticipated to adversely affect Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act.

Section 323.4(a)(1)(C)(2) of the Clean Water Act exempts levee rehabilitations from requiring a Section 404 evaluation and accompanying Section 401 Water Quality Certification so long as the repairs do not result in changes to the character, scope, or size of the original fill design in a manner that affects the waters of the U.S., and will occur within a reasonable period of time after damage occurred.

Proposed work at Ferndale, Guide-Meridian and River Road meet these exemption guidelines. There are no wetlands present in footprints of these proposed projects and no wetland fill is anticipated as a result of these actions.

The setback levee at Hovander represents alterations to the pre-flood footprint of the levee, though for environmentally beneficial reasons. The preferred alternative relocates the levee away from the river allowing for improved floodplain processes. It is likely that wetlands are present along the riverward toe, face, crown, or landward slope of the levee where these setbacks are proposed, and could thus be impacted as a result. If work subject to Section 404 regulation is being conducted, a Section 401 certification may also be required.

Portions of the work proposed at River Road may be in a navigable waterway, so an evaluation would be needed under Sec. 10 of the Rivers and Harbors Act. Proposed work at the remaining levees are not within Section 10 jurisdiction.

Whatcom County is considered coastal under the Coastal Zone Management Act (CZMA). A determination of consistency with state and county shoreline management plans pursuant to the CZMA would be needed.

The project is not anticipated to cause violations of any standards under the Clean Air Act.

EVALUATION

The Corps has made a preliminary determination that the environmental impacts of the proposal can be adequately evaluated under the NEPA through preparation of an EA. Preparation of an EA addressing potential environmental impacts associated with the proposed action is currently underway.

The Corps invites submission of comments on the environmental impact of the proposal. The Corps will consider all submissions received by the expiration date of this notice. The nature or scope of the proposal may be changed upon consideration of the comments received. The Corps will initiate an Environmental Impact Statement (EIS), and afford the appropriate public participation opportunities attendant to an EIS, if significant effects on the quality of the human environment are identified and cannot be mitigated.

Comments should reach this office (address at top), not later than 15 days from the date of this notice in order to ensure adequate consideration. Project information reports associated with this Notice of Preparation, as well as this document can be found at the following website: http://www.nws.usace.army.mil/ers.

Requests for additional information should be directed to Lester Soule, Project Manager, at 206-764-3699 and email address: lester.e.soule@usace.army.mil or the Environmental Coordinator Mr. Jeffrey F. Dillon at telephone 206 764-6174; email address: jeffrey.f.dillon@usace.army.mil.

FERNDALE LEVEE
PROJECT INFORMATION REPORT

PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
FERNDALE LEVEE
NSK-2-09

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PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
FERNDALE LEVEE
NSK-2-09

EXECUTIVE SUMMARY

PROJECT NAME: Ferndale Levee

PROJECT FUNDING CLASS: 320

PROJECT CWIS NUMBER: 322412

PUBLIC SPONSOR: City of Ferndale, Whatcom County, WA

LOCATION AND DESCRIPTION
The non-federal levee is located on the right bank of the Nooksack River near Ferndale, Washington. The levee is approximately 2.5 miles long. Along much of the levee reach, there is a riverward bench. The embankment material consists of compact local borrow material with armor rock erosion protection and a weighted toe. The Ferndale Levee provides a 30-year level of protection.

DESCRIPTION OF DAMAGE
During the January 2009 flood event, the Nooksack River exceeded flood stage (25 -30 year event at Ferndale) and the high velocity flows resulted in toe loss at one site (Site 1) along the levee, and through-seepage at a second site (Site 2). In the current condition, the levee offers 10-year flood protection.

PROPOSED REPAIR
The recommended alternative will repair the levee to the pre-flood level of protection. The preferred alternative is the Repair In-Kind Alternative. The total repair length is approximately 860 linear feet (LF): 450 LF at Site 1 and 410 LF at site 2 (see drawings, Appendix B).

SUMMARIZED FINANCIAL AND ECONOMIC DATA:

Construction subtotal	$133,000
S&A	$11,000
Contingency (10% of construction subtotal)	$13,000
Total Construction Cost	$157,000
Total Engineering and Design (Federal Cost)	$11,000
Total Project Costs	$168,000
Federal Project Cost (80% of total construction + E&D)	$137,000
Public sponsor Project Cost (20% of total construction)	$31,000
B/C ratio	4 to 1

POINT OF CONTACT: Doug Weber, CENWS-OD-EM, (206) 764-3406

PROJECT REPORT

1. Project Identification

Project Name: Ferndale Levee
Project Funding Class: 320
Project CWIS Number: 322412

2. Project Authority

Classification: Non-Federal
Authority: N/A
Estimated original cost of project: Unknown
Construction completion date of the original project: Unknown
Additional information regarding major modifications/improvements/betterments: PL 84-99 repairs carried out in 1996

3. Public Sponsor

a. Sponsor Identification: City of Ferndale
POC for City of Ferndale: Bill Henry, P.E.
Public Works Department
2095 Main St
PO Box 936
Ferndale, WA 98248
(360) 384-4006

b. Application for Assistance:
(1) Date of Issuance of District's public Notice: 13 JAN 2009
(2) Date of Public sponsor's written request: 3 APR 2009 (email request received within 30 days of flood event; formal letter submitted later at District's request)

4. Project Location

a.

City:	Ferndale
County:	Whatcom
State:	Washington
Basin:	Nooksack
River:	Nooksack River
River Mile:	5.5
River Bank:	Right

Additional information
REPORT PURPOSE: This report provides pertinent information regarding the project, the repair plan, estimated quantities, costs and benefit ratios to restore the existing levees to pre-flood condition. Due to the dynamic process of rivers, damages induced by rivers on levees and other structures continuously change. Information including project description and final repair actions contained within this document are subject to change without notice prior to and during construction.

5. Project Design

This non-federal rural levee was constructed to provide flood protection from periodic recurring flooding from the Nooksack River near Ferndale in Whatcom County, Washington. The levee is approximately 15,000 linear feet and is 2 to 4 feet high on the landward side; landward and riverward slopes are typically 2H:1V. The top width is approximately 8 ft. The levee is predominantly composed of local borrow material. The levee was designed with armor rock erosion protection and a weighted toe. Between the

Ferndale Levee and the Nooksack River, there is typically a narrow vegetated bench. The levee was designed to provide 30-year level of protection.

6. Disaster Incident

Major flooding occurred on the Nooksack River in January 2009 with a 25 to 30-year flood event occurring at the Ferndale gage. Peak rainfall totals occurred during this time. For more information on the flood event, see Seattle District's EngLink Situation Reports for Winter Flood Event #3, January 2009.

7. Project Damages

The January 2009 Nooksack River flooding resulted in damage at two sites along the Ferndale Levee. At Site 1 (downstream–450 LF) the damage is comprised of toe loss. At Site 2 (upstream–410 LF) there was significant through-seepage of flood water and resulting backslope deterioration. In the current condition, the levee offers 10-year flood protection.

8. Project Performance Data

There was a continuing eligibility levee inspection performed in October 2003. The levee was found to be in acceptable condition. The Sponsor expends approximately $2,000 in annual maintenance for this levee.

Inspection Results:
(1) Date of last inspection: October 2003
(2) Type of last inspection: CEI
(3) Project condition code of last inspection: Acceptable
(4) Status:
Sponsor's Annual O&M Costs: $2,000
Estimated Cost to Repair Maintenance Deficiencies: N/A

9. Project Alternatives Considered

Multiple alternatives were considered including the No-Action, Repair In-Kind, Setback and Non-Structural alternatives. At this stage in the project, a preliminary analysis has been preformed on the following alternatives:

No Action Alternative

The No-Action alternative would leave the levee in its current damaged condition. This alternative was not considered further because of the high potential of flood damages to the protected infrastructure, businesses, and homes protected by the Levee.

Setback Levee Alternative

A setback/road raise option was considered and not selected. Setback is not economically feasible at this time due to the high real estate and construction costs required to realign and rebuild the road and the levee.

Repair In-Kind Alternative

This alternative was evaluated and selected as the recommended alternative. Repairs would rebuild the damaged levee to its pre-flood conditions.

Non-Structural Alternative

This alternative would relocate all existing structures, utilities and other infrastructure within the damage area protected by this section of levee. The costs associated with this alternative were deemed too high for the level of benefit associated with this alternative.

10. Recommended Alternative

A selection of a recommended alternative was made: Repair In-Kind Alternative.

Site 1: The repair consists of rebuilding and replacing the missing toe material along a 450 LF reach with class V riprap on a 1.5:1 slope. The site will be accessed from the bench upstream of the damaged area. An access ramp will be constructed and will be removed at the project's conclusion. The project will make every effort to minimize ground disturbance. It is anticipated that approximately 4 to 6 mature trees will be removed to access the toe. In addition, invasive vegetation will be removed as part of the construction within the construction footprint. Rock will be installed ahead of the equipment to establish a 6-foot high by12-foot wide toe structure, and will support the equipment as construction proceeds downstream. Upon completion of the project, the access ramp will be removed and the bench will be planted with native species and all disturbed areas will be hydroseeded with native grasses.

Site 2: Additional material will be placed along 410 LF of the backslope of the levee to eliminate through seepage, as indicated on the drawings (Appendix B). The backslope will be reestablished at 2H:1V except for two 6 foot wide locations, which will be sloped at 4H:1V to allow for pedestrian access. All disturbed areas will be hydroseeded with native grasses at the conclusion of construction.

Confirmation of the recommended alternative and finalization of the design, including additional NEPA/ESA required features, will occur during the NEPA process and before construction.

11. Lands, Easements, Rights-of-Way, Relocations, and Disposal areas (LERRD)

The Ferndale Levee Rehabilitation effort consists of two separate repair sites located within an approximately 1,200 foot long section of existing levee on the right bank of the Nooksack River in Section 29, Township 39 North, Range 2 East, Willamette Meridian, in Whatcom County, Washington. The proposed Rehabilitation effort will return the levee to pre-flood condition and level of protection, within the existing levee project footprint. Acquisition of additional perpetual property interests will be required if the proposed Rehabilitation effort footprint exceeds the area covered by the Sponsor's existing perpetual levee easements, or if the existing easements do not provide the required interests in project lands.

In order to proceed with the Rehabilitation effort the Sponsor must make the required levee project lands available prior to solicitation for the construction contract. See the proposed project schedule under Section 15 of this report.

To meet the real estate requirements for the Rehabilitation effort, the Sponsor will need to demonstrate that it has the real property interests listed below:

> PERPETUAL FLOOD PROTECTION LEVEE EASEMENT ESTATE
> A perpetual and assignable right and easement in the land delineated on the attached location map, Exhibit _ (Exhibit to be prepared during the next phase - Engineering and Design [E&D]), by this reference made a part hereof, to construct, maintain, repair, operate, patrol and replace a flood protection levee, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired.

Perpetual access (both ingress and egress) to the Rehabilitation effort site is available directly from Ferndale Road, a public right-of-way (See project map – Appendix B).

Construction staging will occur within the perpetual levee easement footprint. If it is later determined that a temporary construction staging area, or temporary access road is required for construction, the Sponsor will need to demonstrate that it has the below real property interests for those areas.

> TEMPORARY WORK AREA EASEMENT
> A temporary easement and right-of-way in, on, over, and across the land delineated on the attached location map, Exhibit _ (Exhibit to be prepared during the next phase – E&D), for a period not to exceed one (1) year, beginning with date possession of the land is granted to the Grantee for use by the United States, its representatives, agents, and contractors as a work area, including the right to deposit fill material thereon, move, store, and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Ferndale Levee Project Rehabilitation Effort, Job No. NSK-2-09, together with the right to trim, cut, fell, and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads.

The final location of temporary access routes and temporary disposal sites will be determined in the next project phase – Engineering and Design (E&D). Additionally, if the COE, Real Estate Division determines the Sponsor does not have adequate real property interests for the lands needed for the proposed Rehabilitation effort, including additional damage not visible at the time of inspection because of the presence of vegetation, then acquisition of property interests may be necessary. The need for the Sponsor to acquire or cure its existing property interests could result in further delay of repairing the damaged levee as proposed in the project schedule – see Section 15 of this report.

As part of the land certification process for the Rehabilitation effort, the Sponsor will need to provide title reports not more than 90 days-old at the time of land certification demonstrating its real property interests in the lands required for the proposed levee repairs.

Any questions regarding types of property interests needed for the proposed project should be coordinated with COE, Real Estate Division.

12. Economic Evaluation

This levee has been classified as a non-federal rural levee in the PL 84-99 program. In its current damaged, or without-project condition, it provides protection from flooding for up to a 10-year event.

The economic evaluation was conducted in accordance with EP 500-1-1 and ER 500-1-1. Costs are annualized over the project period of analysis at the current federal interest rate of 4.625%. Benefits are based on the expected flood damages prevented as a result of the project. In accordance with EP 500-1-1, the maximum period of analysis for a non-federal agricultural levee is 10 years. For all other levees, the period of analysis is the shortest of the following time periods:

(1) With-project level of protection (30 years);
(2) Fifty years; or
(3) Remaining life of the project (50 years).

The period of analysis for the Ferndale Levee is therefore 30 years.

The floodplain resulting from a levee breach in the damaged area includes over 5100 acres (8 square miles) of mixed use and mainly Tribal land of the Nooksack Reservation. Most of the land use is comprised of numerous agricultural and dairy farms with farm structures, farm equipment, crops and

livestock, the Silver Reef Casino and other Tribal facilities. If this area flooded it would also close Slater Road, Haxton Way, and Marine Drive, which provide critical access to the Tribal lands on Sandy Point and the ferry to Lummi Island, threatening the public health and safety of all those residing in the effected areas. Additionally the City of Ferndale's water treatment plant would be threatened.

The Corps best professional judgment was used to estimate low or conservative estimate of values due to lack of specific data. The property in the floodplain is worth more than 11 million dollars in value and damages to structures and contents would exceed one million based on two to four feet of inundation depth. The actual damage would likely be much greater, since there are many damages that are typical of flooding that will not be counted because the damages avoided here are more than adequate to justify the project.

Table 1 shows a gross and limited inventory of some of the properties in the floodplain. All values are rounded to the nearest $100,000 to reflect the lack of detailed information.

Table 1

Estimated Minimum Value of Property in the Flood Plain		
Tribal Facilities	$	2,500,000
Water Treatment Plant	$	1,000,000
Farm buildings and equipment (over 20 farms)	$	2,000,000
Land	$	5,100,000
Single Family Residences (more than 30)	$	900,000
Total	**$**	**11,500,000**

The U.S. Army Corps of Engineers and FEMA have developed statistical relationships between the value of property and the damages caused by flood waters to both structures and contents. The values of the structures alone are at least $5.4 million. The county hydraulic model that estimates the extent of the floodplain does not provide detailed water surface elevations, however it does show that the difference in water surface elevations in the floodplain between a 10-year event and a 100-year event is as about 6 feet. The 10-year event is the zero damage point. Assuming that a 30-year event inundates the floodplain with two feet or more of water and inundates the structures in the floodplain with an average of six inches of water results in estimated damages of $1,568,700 for that event.

Table 2

Estimated minimum damages to structures and contents		
30-year event (6 inches ave depth)	$	1,568,700
10-year event zero damage	$	-

The annual benefits for repair of the levee are the annual damages reduced by restoring the level of protection to the 30-year level that existed before the damage was incurred. Annual benefits are the difference between the with- and without-project expected annual damages (EAD). The EAD is the probability weighted sum of damages from the without-project level of protection event (10-year) to the with-project level of protection (a 30-year event). Table 3 shows the with- and without-project EAD and the resulting expected annual damages reduced or benefits for restoring the level of protection to the levee. This is just a partial estimate of what a full inventory of damages would be; there are substantial

damages that have not been estimated, such as emergency and cleanup costs, opportunity costs of time, damages to roads, damages to crops, damages to the city water supply, etc.

Table 3

With and Without Project EAD (rounded to $1,000)		
Without Project	**With Project**	**Damages Reduced (Annual Benefits)**
$ 105,000	$ 52,000	$ 53,000

The total estimated project costs to restore 30-year protection to the Ferndale Levee are $168,000. Table 4 displays the rounded project costs, annualized costs, and resulting benefit-cost ratio (BCR).

Table 4

Annualized Costs and Benefit-Cost Ratio	
First Cost	**$168,000**
Annual Cost	
Interest and Amortization (25 yrs @ 4.625%)	$11,000
O&M[1]	$2,000
Total Annual Cost	$13,000
Minimum annual benefits	$53,000
Benefit-Cost Ratio (BCR)	**4 to 1**

Distribution of project benefits
The protected area is owned by at least 20 farmers and the general public. No individual receives more than 25% of the benefits.

The following checks were performed:

1. Total estimated value of property
Greater than $11,500,000

Check #1 is affirmative - First Cost of levee rehab is significantly less than the total value of property protected.

2. Value of cropland - N/A; no crop damages are being claimed.
3. Net Farm Income per acre – N/A; no crop damages are being claimed.

13. Environmental

In the project area the Nooksack River is a confined, single channel, low gradient system. The river provides migration, spawning and rearing for all salmon species utilizing the lower mainstem Nooksack. These species include Chinook, pink, chum, steelhead and large numbers of coho. The Nooksack in the

[1] A detailed breakdown of the operation and maintenance costs for each levee is not available, but $2,000 per levee per year is a generally accepted estimate.

project reach is part of Chinook salmon critical habitat. Winter steelhead spawning occurs a short distance upstream of the project site. Chum and coho spawn in the project reach.

If construction of the levee can be carried out in the approved in-water work window (15 June to 31 August, odd years due to pink salmon migration), no long-term impacts to the environment are anticipated, but any removal of notable bank vegetation will result in loss of cover, shading, and input of organics, nutrients and insects that would benefit the aquatic ecosystem including salmonids. Replanting to make up for lost vegetation will be needed, but even if it occurs quickly, there would be a temporal lag in effectiveness of that replanting. Overall effects, both adverse and favorable, should be minimal, if properly addressed. However, the complete loss of vegetation will be avoided, if possible, to reduce any unnecessary impacts. In-water work that goes beyond the work window has the potential for more negative and possibly prolonged effects. All effort should be made to retain as much vegetation as possible. If the work is outside the footprint of the original levee, then it will be subject to other requirements.

Environmental documentation. This will need to include an Environmental Assessment pursuant to NEPA, a Biological Evaluation or Biological Assessment pursuant to the Endangered Species Act, a Sec. 404 evaluation (or determination that by analogy to a Nationwide Permit, the emergency repair is exempt from 404 requirements) under the Clean Water Act, a Sec. 10 evaluation pursuant to the Rivers and Harbors Act (this reach of the Nooksack is navigable), and a determination of consistency with state and county shoreline management plans pursuant to the Coastal Zone Management Act.

The following threatened species are expected to be found in the project area:

- Puget Sound Chinook salmon,
- Puget Sound steelhead, and
- Coastal/Puget Sound bull trout.

It is anticipated that marbled murrelet, listed as threatened, could transit the area while traveling between nesting areas in the upper watershed, and feeding areas in Puget Sound. Potential effects of the proposed work on threatened or endangered species and designated critical habitat will be addressed per Section 7 of the Endangered Species Act. Bald eagles may be present at the project site. These birds have been removed from the Endangered Species Act but remain protected under the Bald and Golden Eagle Protection Act so caution will be taken to avoid significant harm to the birds or their habitat; there is a nest about 3/4 mile to the south. Other listed species in Whatcom County are Canada lynx, gray wolf, grizzly bear, and northern spotted owl; however, they are not expected to be present in the project area due to specialized habitat requirements, lack of tolerance for human activity, or both, so there would be no effect on them.

Potential Issues:

a. Water Quality. There will be short-term impacts from the construction of repairs to the levee. There may be a temporary increase in turbidity due to fill placement. Turbidity may be monitored during construction. If turbidity exceeds water quality standards, construction will recommence when turbidity returns to acceptable levels.

b. Fish and Wildlife. There will be short-term impacts from construction of the replacement levee. The primary impact will be the direct removal of trees at the toe of the levee and along the access ramp alignment at the upstream end of the repair area. Secondary impacts will be a temporary loss of riparian cover along the water's edge, with consequential loss of shading/cooling, overhead cover, and input of insects, organic material and nutrients. There would be a temporary increase in turbidity due to fill

placement. If the work will be accomplished during the established work window (15 June to 31 August, odd years due to pink salmon migration), the potential disruption of salmonid movement in the area will be minimized, but currently timing cannot be guaranteed. If present, adult and juvenile salmonids will be temporarily displaced from this area. Construction noise may temporarily disturb any wildlife in the area. The Corps will make all efforts to complete any in-water work within the fish work window. As soon as the Corps confirms the construction schedule, resource agencies and tribes will be notified of any potential disturbance that may occur outside of the work window.

c. Wetlands. Construction activities will be done so as to avoid any impacts to wetlands.

d. Navigable Waters. Portions of this project may lie within traditionally navigable waters below MHHW and therefore subject to Sec. 10 of the Rivers and Harbors Act. A determination of Sec. 10 jurisdiction and evaluation of fill elevations may be necessary.

e. Historic Properties Considerations. A search of the Washington State Department of Archaeology and Historic Preservation (DAHP) database was conducted on 20 February 2009 to identify any potential archaeological, National Register, or State Historical sites in the vicinity of the levee damage sites. The nearest recorded sites are within one mile of the project area.

Prior to repairs, a Corps archeologist will conduct a cultural resources survey of the project area to determine whether there is a potential for the proposed repairs to cause effects to historic properties. National Historic Preservation Act Section 106 compliance reports will be prepared for all proposed 2009 levee repairs. The report will include the findings of the investigations for each repair site, recommendations for archaeological monitoring during construction, and a determination of effects to archaeological and historic properties. If archaeological monitoring is recommended at some repair locations, the report will include a monitoring plan and protocols to be followed. The protocols will include an inadvertent discovery clause that will apply when an archaeological monitor is not present. The Corps' determinations of effects to historic properties, the investigation report, and monitoring plan will be reviewed and approved by the Washington State Historic Preservation Officer (SHPO) and the appropriate tribes prior to construction.

f. Recreation. This section of levee is not considered a recreational area, as it is along a section of road that has no shoulder or safe access to the riverbank. There should be no impacts to boaters.

g. Cumulative Effects. Cumulative effects will be addressed as required pursuant to NEPA and ESA.

h. Coordination. The proposed work is formally coordinated throughout the planning, design, and construction phases with the following agencies:

(1) U.S. Fish and Wildlife Service;
(2) NOAA Fisheries;
(3) Environmental Protection Agency;
(4) Washington Department of Fish and Wildlife;
(5) Washington Department of Ecology;
(6) Nooksack Tribe;
(7) Lummi Tribe; and
(8) State Historic Preservation Office.

Their recommendations will be considered and implemented as appropriate. The design will be coordinated with and reviewed by the above listed agencies. In accordance with ER 200-2-2, Procedures for Implementing NEPA, paragraph 8, Emergency Actions, the environmental effects of the proposed levee rehabilitation will be considered during the planning process. An environmental assessment (EA)

will be prepared to evaluate probable impacts of the project on the existing environment. Factors addressed by the evaluation will include, but will not be limited to, public safety, water quality, wetlands, threatened and endangered species, noise, economics, fish, and wildlife. The EA will be coordinated with applicable Federal and State resource agencies. The NEPA process will conclude pursuant to requirements in ER 200-2-2. NEPA documentation is anticipated to finish approximately 84 days after the project begins. In addition, requirements for compliance with the Endangered Species Act will be completed. According to Title 33 Code of Federal Regulations, Section 323.4(a)(2), emergency reconstruction of recently damaged parts of levees does not require a Section 404 evaluation provided that the work does not include any modification that changes the character , scope, or size of the original fill design. Concerning scope and size, the proposed repair will not require a Section 404 evaluation as long as the footprint of the levee repair that falls within water of the United States is no larger than the pre-damage footprint. If a Section 404 evaluation is not required, a Section 401 water quality certification from the Washington Department of Ecology is not required. This project will require a determination of consistency with state and county shoreline management plans pursuant to the Coastal Zone Management Act.

i. Environmental enhancement features. Project construction may include environmental enhancement features to offset temporary construction impacts. One such feature will consists of removal of invasive species during construction along the access ramp. Once repairs have been completed the access ramp will be removed and the bench will be planted with native species and all disturbed areas will be hydroseeded with native grasses. Environmental features proposed by agencies will be fully engineered and reviewed during E&D.

14. Interagency Levee Task Force

HQUSACE has not directed activation of an Interagency Levee Task Force for the flood event associated with the January 2009 flood event in Western Washington. However, informal coordination with FEMA is ongoing.

15. Project Management

a. Funding Authority
   (1) Program and Appropriation: FC&CE 3125
   (2) Project Funding Class: 320
   (3) Project CWIS Number: 322412

b. Project Funds: Project Cost Estimate at March 2009 Price Level

Table 5 - Project Cost Estimate

Equipment	$35,000
Material	$98,000
Subtotal Construction Cost	**$133,000**
Supervision & Administration	$11,000
Contingency (10% of construction subtotal)	$13,000
Total Construction Cost	**$157,000**
Engineering & Design	$11,000
Total Project Cost	**$168,000**
FEDERAL Share (80% of Total Construction + E&D)	**$137,000**
SPONSOR Share (20% of Total Construction)	**$31,000**

c. Project Repair Schedule

The 2009 in-water work window is 15 June to August 31. No in-water work is anticipated outside this window.

Table 6 - Project Repair Schedule

RESPONSIBLE PARTY	MILESTONE TAKS	MILESTONE DATE
COE	PIR Approval	27 April 2009
COE	E&D complete	1 June 2009
COE	CA and LER Cert Documents to Public Sponsor, and Designs for Review NLT	20 May 2009
Public Sponsor	Public Sponsor signs CA	31 May 2009
COE	Environmental Documentation	1 June 2009
COE	DE signs CA	3 June 2009
Public Sponsor	Public Sponsor certifies lands	8 June 2009
Public Sponsor	Public Sponsor provides cash contribution	17 June 2009
COE	RE Division Certifies Lands Available	8 July 2009
COE	Solicit contractors	9 July 2009
COE	Initiate (rental equipment) construction	30 July 2009
COE	Complete Construction	28 September 2009

d. Project Authentication

Project Management	Les Soule	(206) 764-3699
Emergency Management approval	Paul Komoroske	(206) 764-3406

e. Technical Points of Contact

Emergency Management	Doug Weber	(206) 764-3406
Economics	Don Bisbee	(206) 764-3713
Environmental	Jeff Dillon	(206) 764-6174
	Jeff Laufle	(206) 764-6578
Cultural Resources	Kat Kelly	(206) 764-7857
Engineering and Design	Cathie Desjardin	(206) 764-3542
Program Management	Doug Weber	(206) 764-3406
Real Estate	Kevin Kane	(206) 764-6652
Hydraulics and Hydrology	Travis Ball	(206) 764-3277
	Zac Corum	(206) 764-6581

APPENDICES
Appendix A: Project Sponsor's request for Rehabilitation Assistance

PUBLIC WORKS DEPARTMENT
2095 MAIN STREET / P.O. BOX 936
FERNDALE, WA 98248
(360) 384-4006

April 3, 2009

Doug Weber
US Army Corps of Engineers
P BOX C-3755
4735 East Marginal Way S.
Seattle WA 98124-2255

Re: Levee Repair Work – City of Ferndale

Dear Mr. Weber:

During the flooding January 7-9, 2009, the levee on the west side of the Nooksack River along Ferndale Road was damaged. Approximately 300 feet has some undermining, starting about 2400 feet south of Main Street.

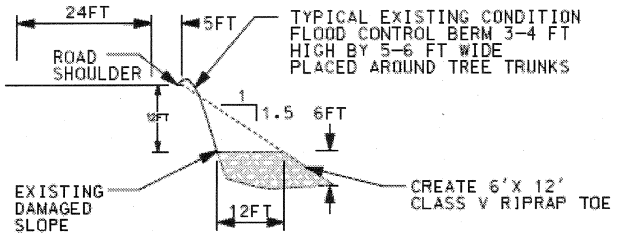
The City of Ferndale is officially requesting assistance under the PL84-99 Program in implementing repair projects at this location. The city will act as the local sponsor and provide all necessary lands, rights-of-way and easements for this project.

If you have any questions, please contact the undersigned.

Yours truly,

Bill Henry, P.E.
City Engineer
City of Ferndale
360 384 4006

Appendix B: Project location and design data, maps, and related information



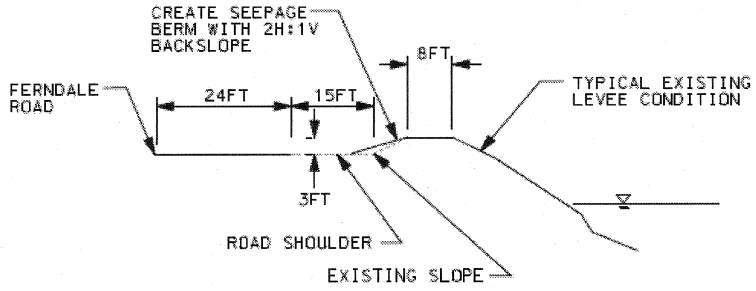
TYPICAL SECTION
SITE 1

NOTES:

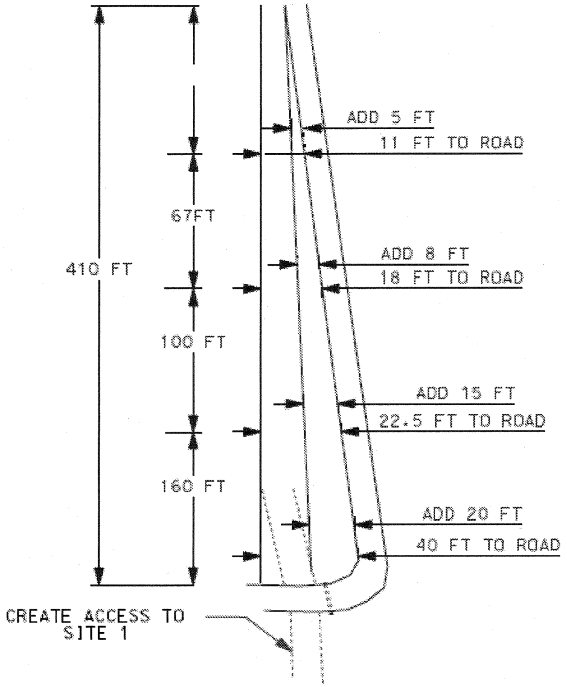
1. SITE1. ACCESS ACROSS LEVEE AT SITE 2 AS SHOWN ON PLAN VIEW AND ACROSS RIVERWARD BENCH BEGIN TO RAMP DOWN AND BUILD TOE IN WATER. REMOVE ACCESS RAMP AT COMPLETION OF CONSTRUCTION

2. SITE 2. ADD MATERIAL TO LANDWARD SIDE OF BERM AS NOTED IN PLAN VIEW.

3. CREATE 4H:1V PEDESTRIAN ACCESS RAMPS AT UPSTREAM AND DOWNSTREAM ENDS. HYDROSEED BACKSLOPE UPON COMPLETION OF CONSTRUCTION



TYPICAL SECTION
SITE 2



PLAN VIEW SITE 2

FERNDALE
TYPICAL SECTIONS

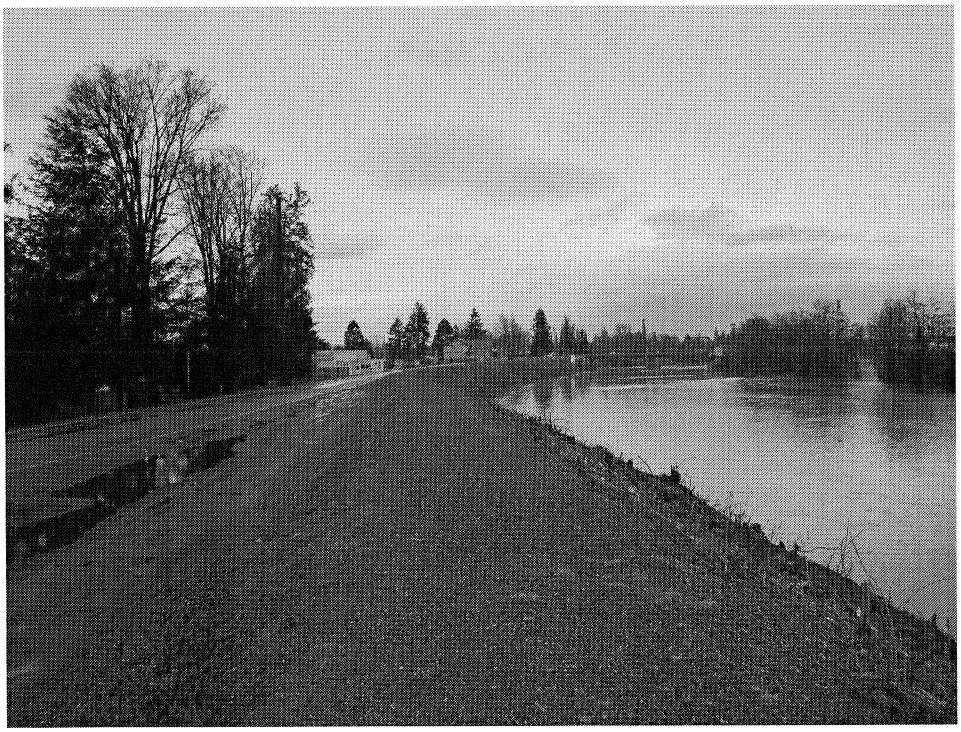
Plate number: C-101

Appendix D: Damages

Photo 1: Site One

Damaged toe (Corps 2009)

Photo 2: Site Two



Backslope Rehab Site (Seepage area) (Corps 2009)

Appendix Z: PIR Review Checklist

EP 500-1-1
30 Sep 01

Ferndale Levee - NSK-2-09

PIR Review Checklist for FCW Rehabilitation Projects

	YES	NO	N/A	
1.	X			The project is active in the RIP. [ER, 5-2.a.]
2.	X			The project was damaged by flood(s) or coastal storm(s). [ER, 5-2.]
3.	X			The Public Sponsor has requested Rehabilitation Assistance in writing. [EP, 5-10.b.]
4.	X			The Public Sponsor has agreed to sign the Cooperation Agreement, which will occur before USACE begins rehabilitation work. [ER, 5-10.]
5.	X			The estimated construction cost of the rehabilitation is greater than $15,000, and is not considered sponsor maintenance. [ER, 5-2.q.]
6.	X			The repair option selected is the option that is the least cost to the Federal government, or, the sponsor's preferred alternative is selected with all increases in cost paid by the public sponsor. PIR includes justification for non-select of the least cost alternative. [ER, 5-2.h. and 5-11.e.(3)]
7.	X			The public sponsor is aware of the opportunity to seek a nonstructural alternative project, and has decided to proceed with a structural rehabilitation. [ER, 5-16]
8.	X			The cost estimate in the PIR itemized the work to identify the Public Sponsor's cost share. [ER, 5-11]
9.	X			The rehabilitation project has a favorable benefit cost ratio of greater than 1.0:1. [ER, 5-2.r.]
10.	X			The proposed work will not modify the FCW to increase the degree of protection or capacity, or to provide protection to a larger area. [ER, 5-2.n.]
11.			N/A	Betterments are paid 100 percent by the Public Sponsor. [5-2.o.]
12.	X			The CA contains a provision for 80% Federal and 20% local cost share for non-Federal projects. [ER, 5-11.a.]
13.			N/A	Cost for any betterments are identified separately in the cost estimate. [ER, 5-2.o.]

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects

PIR Review Checklist for FCW Rehabilitation Projects (Continued)

	YES	NO	N/A	
14.	___	___	N/A	Repair of deliberate levee cuts is the responsibility of the public sponsor, except as provided for in ER 500-1-1, paragraphs 5-2.j. and 4-3.h. [ER, 5-2.j. and 4-3.h.]
15.	X	___		All deficient and deferred maintenance will be paid for or accomplished by the Public Sponsor, without receiving credit toward any sponsor's cost share. [ER, 5-2.g.]
16.	X	___	___	Any relocation of levees is adequately justified. [ER, 5-2.h.]
17.	X	___		USACE assistance does not correct design or construction deficiencies. [ER, 5-12.a.]
18.	X	___		An assessment of environmental requirements was completed. [ER, 5-13., and EP, Figure 5-3, paragraph 12.]
19.	X	___		The project complies with NEPA, and required documentation was completed and placed in Appendix G of the PIR. [ER, 2-3.k.; ER, 5-13.; and EP, Figure 5-3, paragraph 12.] NEPA will be completed in EA
20.	X	___		The Endangered Species Act was appropriately considered. [ER, 5-13.g., and EP, Figure 5-3., paragraph 12.]
21.	X	___		EO 11988 requirements were considered in the process of evaluating the proposed project for rehabilitation. [ER, 5-13.f., and EP, Figure 5-3, paragraph 12.]
22.	X	___		The completed PIR has been reviewed and the PIR Checklist has been reviewed and signed by the Emergency Management Office. [EP, 5-11.a.(3)(a)]
23.	X	___	___	The completed PIR meets all policy, procedural, content, and formatting requirements of ER 500-1-1 and EP 500-1-1. [ER, 2-3.b.]

EM REVIEWING OFFICIAL'S SIGNATURE

Dave Wilcox

NAME Dave Wilcox

TITLE Dpty

TELEPHONE NUMBER (206) 764-3916

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects (Continued)

GUIDE-MERIDIAN LEVEE PROJECT INFORMATION REPORT

PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
GUIDE-MERIDIAN LEVEE
NSK-4-09

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PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
GUIDE-MERIDIAN LEVEE
NSK-4-09

EXECUTIVE SUMMARY

PROJECT NAME: Guide-Meridian Levee

PROJECT FUNDING CLASS: 320

PROJECT CWIS NUMBER: 322416

PUBLIC SPONSOR: Whatcom County, WA

LOCATION AND DESCRIPTION
The levee is located on the right bank of the Nooksack River near Lynden, Washington, from river mile (RM) 15.8 to 16.3. Along most of the levee reach, the levee is set back. The embankment material consists of compact fine silty sands with erosion protection provided by armor rock. Prior to the flood, the Guide-Meridian Levee provided 5 year level of protection. The levee is approximately 14,250 linear feet (LF).

DESCRIPTION OF DAMAGE
During the January 2009 flood event, which ranged from a 15-year flood at the Cedarville gage (RM 31) to a 27 year flood at Ferndale (RM 6), high water velocities resulted in toe scour and slope loss. The damage occurred in two locations, each approximately 250 LF in length. Site one (downstream) experienced toe loss and scour; site 2 (upstream) was damaged by overtopping.

PROPOSED REPAIR
The recommended alternative is to repair the levee in kind to the pre-flood level of protection. The total repair length is approximately 500 LF.

SUMMARIZED FINANCIAL AND ECONOMIC DATA:

Construction subtotal	$208,000
S&A (6%)	$12,000
Contingency (10%)	$21,000
Total Construction	$241,000
Engineering and Design (6%) (Fed Cost)	$14,000
Total Project Costs	$255,000
Federal Project Cost (80% + Engineering and Design)	$207,000
Public sponsor Project Cost (20%)	$48,000
B/C ratio	1.5 to 1

POINT OF CONTACT: Doug Weber, CENWS-OD-EM, (206) 764-3406

PROJECT REPORT

1. Project Identification

Project Name: Guide-Meridian Levee
Project Funding Class: 320
Project CWIS Number: 322416

2. Project Authority

Classification: Non-Federal
Authority: N/A
Estimated original cost of project: Unknown
Construction completion date of the original project: Unknown
Additional information regarding major modifications/improvements/betterments: PL 84-99 repairs carried out in 1995 and 2002.

3. Public Sponsor

a. Sponsor Identification: Whatcom County Flood Control Zone District
POC for Whatcom County: Christina Schoenfelder
Whatcom County Public Works Department
River and Flood Division
322 N. Commercial Street, Suite 120
Bellingham, WA 98225
(360) 676-6876

b. Application for Assistance:
(1) Date of Issuance of District's Public Notice: January 13, 2009.
(2) Date of Public Sponsor's written request (see Appendix A): February 6, 2009

4. Project Location

City:	Lynden
County:	Whatcom
State:	Washington
Basin:	Nooksack
River:	Nooksack River
River Mile:	16.3 to 15.8
River Bank:	Right (see map, Appendix B)

Additional information
REPORT PURPOSE: This report provides pertinent information regarding the project, the repair plan, estimated quantities, costs and benefit ratios to restore the existing levees to pre-flood condition. Due to the dynamic process of rivers, damages induced by rivers on levees and other structures continuously changes, therefore information including project description, actions etc. contained within this document are subject to change with out notice prior to and during construction.

5. Project Design

This non-federal rural levee was constructed to provide flood control protection from recurring flooding from the Nooksack River near Lynden in Whatcom County, Washington. In the project area the Nooksack River is a confined, single channel, low gradient system. The levee is on the downstream reach of an outside bend. River energy is generally parallel to the alignment except during large flood flows when the river energies are directed more into the levee, and during low flow periods when gravel bars

direct flow into the bank. Between the Guide-Meridian Levee and the Nooksack River, there is typically a narrow vegetated bench. The levee is approximately 14,250 linear feet long and is 8 to 10 feet high on the landward side; landward slopes are typically 5H:1V. The top width is approximately 10 to 12 ft. The riverward slope and levee crown have a well established sod cover. The riverward slope ranges from 1H:1V to 1.5H:1V. The levee is predominantly composed of silty, sandy gravel riverbed material. The levee was designed with armor rock protection along the river. The upper set back levee section does not have armor rock. The levee is designed to provide 5 year level of protection.

6. Disaster Incident

Between 7 and 10 January 2009, heavy rains and warm winds of subtropical origin, antecedent low elevation snow and ice, and a series of high tides contributed to moderate to severe flooding in the Nooksack River valley, with damages from the headwaters to the river delta. A 15-year flood event occurred at the Cedarville gage, which increased in magnitude in the downstream direction until reaching a 27-year recurrence interval at Ferndale. For more information on the flood event, see Seattle District's EngLink Situation Reports for Winter Flood Event #3, January 2009.

7. Project Damages

High velocity flows during the January 2009 flood event caused damage in three locations. Overtopping levees located on the opposite bank and existing vegetation may slow flood related erosion in the upper third of the levee prism. In the current damaged condition, the levee offers a two-year level of protection; a two-year flood could breach the already damaged levee and flood onto the extremely low floodplain. Flood damages at Site 1 consist of a breach 200 feet long that was flood fought and closed. Site 2 damages are comprised of 250 LF area of toe scour and slope loss. Site 3 damages consist of 250 LF of back slope overtopping scour damage.

8. Project Performance Data

A continuing eligibility levee inspection was performed in October 2003. The levee was found to be in acceptable condition. The Sponsor expends approximately $2000 in annual maintenance for this levee. The level of maintenance is consistent with Seattle District recommendations.

a. Inspection Results.
   (1) Date of last inspection: October 2003
   (2) Type of last inspection: CEI
   (3) Project condition code of last inspection: Acceptable
   (4) Status: Eligible
b. Sponsor's Annual O&M Costs: $2000
c. Estimated Cost to Repair Maintenance Deficiencies: N/A

9. Project Alternatives Considered

Multiple alternatives were considered including the No-Action, Repair in Kind, Setback and Non-Structural alternatives. At this stage in the project, a preliminary analysis has been performed on the following alternatives:

No Action Alternative

The No-Action alternative would leave the levee in its current damaged condition. This alternative was not considered further because of the high potential of flood damages to farmland and infrastructure.

Setback Levee Alternative

This alternative was discussed and was not pursued further, as it is not the Sponsor-preferred alternative and would be more costly than the recommended plan.

Repair in Kind Alternative
This alternative was evaluated and selected as the recommended alternative. Permanent repairs this summer will reestablish a minimum 5 year level of flood protection.

Non-Structural Alternative
This alternative would relocate all existing structures, utilities and other infrastructure within the damage area protected by this section of levee. This was not a viable alternative for our sponsor. The costs associated with this alternative were deemed too high for the level of benefit associated with this alternative.

10. Recommended Alternative

For the purposes of this PIR, a preliminary selection of a recommended alternative was made: the Repair in Kind Alternative. Site 1 repairs will consist of adding topsoil and hydroseeding. Site 2 repairs entail constructing a new 2H:1V riprap toe and armoring with a 4-foot blanket of riprap to an elevation 5 feet vertically above OHW to replace the missing scoured materials. The construction will require excavating and pulling back the existing bank to accommodate new materials without extending the toe structure beyond the current bankline. The riverward edge of the levee top will be pulled landward 18 feet, allowing for a new riverward bank with a 2H:1V slope. Material excavated pulling the levee top landward will be used to create a more gradual backslope. The upper 1/3 will not be riprapped. Ten 15 to 18-inch diameter logs will be installed in the toe. Native willow planting will occur in the upper 1/3 of the riverward slope along the entire 250 LF. Access to the levee will be along the levee crown and/or along the landward toe. Construction will occur within the established fish window (June 15-August 31). Site 3 repairs consist of back slope filling and re-grading for 250 LF; this work will be completed by the Sponsor. All disturbed areas will be hydroseeded after construction. Final selection of the preferred alternative and finalization of the design, including mitigation, will occur during the NEPA process and before construction.

11. Lands, Easements, Rights-of-Way, Relocations, and Disposal areas (LERRD)

The Guide-Meridian Levee Rehabilitation consists of three separate repair sites on the right bank of the Nooksack River in Sections 20 and 30, Township 40 North, Range 3 East, Willamette Meridian, in Whatcom County, Washington. The proposed rehabilitation will return the levee to pre-flood condition and level of protection within the existing levee project footprint. Acquisition of additional perpetual property interests will be required if the proposed rehabilitation footprint exceeds the area covered by the Public Sponsor's existing perpetual levee easements, or if the existing easements do not provide the required interests in project lands.

In order to proceed with the rehabilitation the Public Sponsor must make the required levee project lands available prior to solicitation for the construction contract. See the proposed project schedule under Section 15 of this report.

To meet the real estate requirements for the rehabilitation, the Public Sponsor will need to demonstrate that it has the real property interests listed below:

PERPETUAL FLOOD PROTECTION LEVEE EASEMENT ESTATE
A perpetual and assignable right and easement in the land delineated on the attached location map, Exhibit A, by this reference made a part hereof, to construct, maintain, repair, operate, patrol and replace a flood protection levee, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired.

Proposed ingress is available from British Columbia Avenue (public road) at the upstream end of the Rehabilitation Effort footprint. The ingress route crosses private farm lands located between British Columbia Avenue and the levee easement footprint. Access along the landward toe of the levee project will be utilized from upstream access road to the two proposed repair sites. Downstream egress from the repair sites is available directly from the levee-top road to Guide-Meridian Road/SR-539, a public highway (See project map). The Public Sponsor will need to demonstrate that it has the below real property interests for perpetual access to the levee easement footprint from British Columbia Avenue.

PERPETUAL ROAD EASEMENT
A perpetual and assignable easement and right-of-way in, on, over and across the land delineated on the attached location map, Exhibit A, for the location, construction, operation, maintenance, alteration and replacement of (a) road(s) and appurtenances thereto; together with the right to trim, cut, fell and remove all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the grantors, their heirs and assigns, the right to cross over or under the right-of-way as access to their adjoining land; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

Construction staging will occur within the perpetual levee easement footprint. The need for additional temporary staging areas is not anticipated. If it is later determined that a temporary construction staging area, or temporary access road is required for construction, the Public Sponsor will need to demonstrate that it has the below real property interests for those areas.

TEMPORARY WORK AREA EASEMENT
A temporary easement and right-of-way in, on, over, and across the land delineated on the attached location map, Exhibit A, for a period not to exceed five (5) months, beginning with date possession of the land is granted to the Grantee for use by the United States, its representatives, agents, and contractors as a work area, including the right to deposit fill material thereon, move, store, and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Guide-Meridian Project Rehabilitation Effort, Job No. NSK-4-09, together with the right to trim, cut, fell, and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads.

The final location of temporary access routes and temporary disposal sites will be determined in the next project phase – Engineering and Design (E&D). Additionally, if the COE, Real Estate Division determines the Public Sponsor does not have adequate real property interests for the lands needed for the proposed Rehabilitation Effort, including additional damage not visible at the time of inspection because of the presence of vegetation, then acquisition of property interests may be necessary. The need for the Public Sponsor to acquire or cure its existing property interests could result in further delay of repairing the damaged levee as proposed in the project schedule – see Section 15 of this report.

As part of the land certification process for the Rehabilitation Effort, the Public Sponsor will need to provide title reports not more than 90 days-old at the time of land certification demonstrating its real property interests in the lands required for the proposed levee repairs.

Any questions regarding types of property interests needed for the proposed project should be coordinated with COE, Real Estate Division.

12. Economic Evaluation

This levee has been classified as a non-federal rural levee in the PL84-99 program. In its current damaged condition, it provides protection from flooding for up to an annual (one year) event.

The economic evaluation was conducted in accordance with EP 500-1-1 and ER 500-1-1. Costs are annualized over the project period of analysis at the current federal interest rate of 4.625%. Benefits are based on the flood damages prevented as a result of the project. In accordance with EP 500-1-1, the maximum period of analysis for a non-federal agricultural levee is 10 years. For all other levees, the period of analysis is the shortest of the following time periods:

1) With Project level of protection (Between 5 and 10 years)
2) Fifty years
3) Remaining life of the project

The Period of analysis for the Guide-Meridian Levee is therefore 5 years.

The Guide-Meridian Levee protects approximately 770 acres (1.20 square miles) of farmland and associated farm structures[1]. The principle crops are silage corn (61%), silage grass (39%), and raspberries (5%) grown by approximately 20 farmers. In the without project, or current damaged condition, this farmland would be expected to flood annually. The best use of farmland flooded bi-annually is low quality pasture.

The Guide-Meridian Levee also protects Flynn Road and River Road. The agricultural benefits presented below are sufficient to justify the project, so road benefits were not calculated.

Table 1 below shows the With and Without Project land use.

Table 1

With and Without Project Land Use			
Acres	Percentage	Without Project Land Use	With project Land Use
35	5%	Pastureland	Rasberries
285	37%	Pastureland	Silage Grass
450	58%	Pastureland	Silage Corn
770	**100%**	**Pastureland**	**Composite**

Detailed farm budget analysis is not possible within the constraints of the PL84-99 program, due to the quantity of new information that must be acquired for farming in this area. Estimated lease rates for land suitable for various crops have been obtained from Whatcom County agricultural extension agents and bankers. Assuming that farmers do not pay more for leasing the land than they expect to earn in income, lease rates provide a reasonable estimate of the change in income resulting from protecting land from annual flooding. This serves as a proxy for the more detailed and resource intensive methodology used in feasibility level study. Table 2 below provides estimates of valuations and lease rates[2] for the most typical crops in the county.

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[1] Based on data supplied by Whatcom County

[2] Conversations with Whatcom County agricultural agents indicated potentially much higher land values, due to the high value of berry crops such as blueberries and raspberries of up to $30,000 per acre; however the higher prices

Table 2

Agricultural Land Use Estimated Valuations			
	Average Range of Per Acre Valuations	Range of Annual Lease Rates	Average Annual Lease Rate
Rasberries/Blueberries	$ 8,000	$350 to $450	$ 400
Silage Corn	$ 5,500	$200 to $300	$ 275
Silage Grass	$ 3,000	$100 to $200	$ 150
Unprotected Pastureland	$ 2,300	$80 to $150	$ 115

Restoring the Guide-Meridian Levee to a 5 year level of protection will allow higher value crop production and land use to continue. Table 3 below (With Project annual benefits) shows the changes in income and land values in the With and Without project conditions. With Project annual benefits are about $92,000.

Table 3

With Project Annual Benefits						
Acres	With project Land Use	Percentage	Without Project Annual Income per Acre	With Project Annual Income per Acre	With Project Per Acre Benefit	Total Annual Benefit
35	Rasberries	5%	$ 115	$ 400	$ 285	$ 9,975
285	Silage Grass	37%	$ 115	$ 150	$ 35	$ 9,975
450	Silage Corn	58%	$ 115	$ 275	$ 160	$ 72,000
770	**Composite**	**100%**	**$ 115**	**$ 234**	**$ 119**	**$ 91,950**

Table 4 displays the costs, annualized costs, and resulting BCR.

Table 4

Annualized Costs and Benefit-Cost Ratio	
First Cost	**$255,000**
Annual Cost	
Interest and Amortization (5yrs. @4.625%)	$58,000
O&M[3]	$2,000
Total Annual Cost	$60,000
Benefit-Cost Ratio	**1.5 to 1**

Table 5 below shows the land valuations by crop.

---

appeared to be somewhat anomalous and not representative, so lower, more typical valuations, were used. There is not enough data (i.e. comparable sales) for more detailed statistical analysis.

[3] A detailed breakdown of the operation and maintenance costs for each levee is not available, but $2,000 per levee per year is a generally accepted estimate.

Table 5

Total Valuations				
Acres	With project Land Use	With Project Value/Acre	Total Value	5% of Total Value
35	Rasberries	$ 8,000	$ 280,000	14,000
285	Silage Grass	$ 3,000	$ 855,000	42,750
450	Silage Corn	$ 5,500	$ 2,475,000	123,750
Total Valuations	**Composite**	**$ 4,250**	**$ 3,330,000**	**166,500**

The following checks were performed:

1. Total estimated value of property

Land	$3,330,000
Buildings (No structure damages claimed)	$ -
Total appraised value of affected parcels	$3,330,000

Check #1 is affirmative - First Cost of levee rehab is significantly less than the total value of property protected.

2. Value of cropland

Farm Land	770 acres
Value	$3,330,000
5% of Value	$166,500
Benefits per acre	$119

Check #2 is affirmative - $119 per acre in annual benefits is significantly less than 5% of the total value of the acreage.

3. Net Farm Income per acre (based on Whatcom County Agricultural Statistics, 1997 data, 2004 prices)

Income Per Acre	$653
Benefits Per Acre	$119

Check #3 is affirmative – The benefits of $119 per acre are significantly less than the average net farm income of $653 per acre. This project is economically justified.

Distribution of project benefits
The protected area is owned by at least 20 farmers. No individual receives more than 25% of the benefits.

13. Environmental

Potential Issues:
a. Water Quality. There will be short-term impacts from the construction of repairs to the levee. There may be a temporary increase in turbidity due to fill placement. Turbidity may be monitored during construction. If turbidity exceeds maximum water quality standards, construction will recommence when turbidity returns to acceptable levels.

b. Fish and Wildlife. The river provides migration, spawning and rearing for all salmon species utilizing the lower mainstem Nooksack. These species include Chinook, pink, chum, steelhead and large numbers of Coho. The following threatened species are expected to be found in the project area:

- Puget Sound Chinook salmon
- Puget Sound steelhead
- Coastal/Puget Sound bull trout

It is also anticipated that marbled murrelet, listed as threatened, could transit the area while traveling between nesting areas in the upper watershed, and feeding areas in Puget Sound. Potential effects of the proposed work on threatened or endangered species and designated critical habitat will be addressed per Section 7 of the Endangered Species Act. Bald eagles may be present at the project site. These birds have been removed from the Endangered Species Act but remain protected under the Bald and Golden Eagle Protection Act so caution will be taken to avoid significant harm to the birds or their habitat. Other listed species in Whatcom County are Canada lynx, gray wolf, grizzly bear, and northern spotted owl; however, they are not expected to be present in the project area due to specialized habitat requirements, lack of tolerance for human activity, or both, so there would be no effect on them.

There will be short-term impacts from construction of the replacement levee. The primary impact will be the removal of existing vegetation including approximately 15-20 small cottonwoods / alders and one large cottonwood on the waterward face of the levee along with associated brush. This removal is necessary to reestablish the toe repairs. Secondary impacts will be a temporary increase in turbidity due to fill and LWD placement and continued reduction in riparian productivity. The work will be accomplished during the established work window (15 June-31 August). This will minimize the potential disruption of salmonid movement in the area. If present, adult and juvenile salmonids will be temporarily displaced from this area. The Corps will target all in-water work for completion within the fish work window. As soon as the Corps confirms the construction schedule, resource agencies and tribes will be notified of any potential disturbance that may occur outside of the work window. If work must occur in water after the window closes, then the remaining in-water work will be coordinated with the natural resource agencies. Construction noise and activity will temporarily disturb any wildlife in the area.

c. Wetlands. Construction activities will avoid impacts to wetlands. Bankside vegetation along this prism is notable, consisting mostly of cottonwood and alder between 10 and 20 inch diameter at breast height (dbh) with a few larger specimens present. Underbrush consists primarily of blackberry. Silt buildup captured by the vegetation during the receding arm of the floods contributed to the levee's over-steepened appearance but did not provide the soil development necessary to establish a jurisdictional wetland. A survey will be conducted landward of the levee and at access road alignments to confirm the status of wetland impacts prior to construction.

d. Navigable Waters. The river along this reach is navigable, and the project is therefore subject to Sec. 10 of the Rivers and Harbors Act.

e. Historic Properties Considerations. A search of the Washington State Department of Archaeology and Historic Preservation (DAHP) database was conducted on 20 February 2009 to identify any potential archaeological, National Register, or State Historical sites in the vicinity of the levee damage sites. The nearest recorded sites are within one mile of the project area.

Prior to repairs, a Corps archeologist will conduct a cultural resources survey of the project area to determine whether there is a potential for the proposed repairs to cause effects to historic properties. National Historic Preservation Act Section 106 compliance reports will be prepared for all proposed 2009 levee repairs. The report will include the findings of the investigations for each repair site, recommendations for archaeological monitoring during construction, and a determination of effects to

archaeological and historic properties. If archaeological monitoring is recommended at some repair locations, the report will include a monitoring plan and protocols to be followed. The protocols will include an inadvertent discovery clause that will apply when an archaeological monitor is not present. The Corps' determinations of effects to historic properties, the investigation report, and monitoring plan will be reviewed and approved by the Washington State Historic Preservation Officer (SHPO) and the appropriate tribes prior to construction.

f. Recreation. This section of levee is not considered a recreational area.

g. Cumulative Effects. Cumulative effects will be addressed as required under NEPA and ESA.

h. Coordination. The proposed work is formally coordinated throughout the planning, design, and construction phases with the following agencies:

(1) U.S. Fish and Wildlife Service
(2) NOAA Fisheries
(3) Environmental Protection Agency
(4) Washington Department of Fish and Wildlife
(5) Washington Department of Ecology
(6) Nooksack Tribe
(7) Lummi Tribe
(8) State Historic Preservation Office

Their recommendations will be considered and implemented as appropriate. In accordance with ER 200-2-2, Procedures for Implementing NEPA, paragraph 8, Emergency Actions the environmental effects of the proposed levee rehabilitation will be considered during the planning process. An environmental assessment (EA) will be prepared to evaluate probable impacts of the project on the existing environment. Factors addressed by the evaluation include, but are not limited to, public safety, water quality, wetlands, threatened and endangered species, noise, economics, fish, and wildlife. The EA will be coordinated with applicable Federal and State resource agencies. The NEPA process will be concluded as pursuant to requirements in ER-200-2-2. This process includes compliance with the Endangered Species Act. The local sponsor will be required to obtain all applicable local and state permits. According to the Code of Federal Regulations Title 33, Section 323.4(a)(2), emergency reconstruction of recently damaged parts of levees does not require a Section 404 permit provided that the work does not include any modification that changes the character, scope, or size of the original fill design. The proposed repair will not require a Section 404 permit as long as the footprint of the levee repair that falls within waters of the United States is no larger than the pre-damage footprint. Since a Section 404 permit is not required, a Section 401 water quality certification from the Washington Department of Ecology is not required. A determination of consistency with state and county shoreline management plans pursuant to the Coastal Zone Management Act will be needed.

i. Environmental enhancement features. Project construction will include environmental enhancement features to offset temporary construction impacts. Environmental features proposed by agencies will be fully engineered and reviewed during E&D. Specifically, willow stakes will be planted above OHW as shown in the drawings. The Sponsor will water willow stakes as necessary during the first two years to insure adequate survival. Large woody debris in the form of coniferous logs with roots attached will be placed throughout the project length and oriented slightly upstream as shown on the drawings. This will be done to enhance in-water productivity and fish habitat and minimize impacts from the toe construction.

14. Interagency Levee Task Force

HQUSACE has not directed activation of an Interagency Levee Task Force for the flood event associated with the January 2009 flood event in Western Washington. However, informal coordination with FEMA is ongoing.

15. Project Management

a. Funding Authority
(1) Program and Appropriation: FC&CE 3125
(2) Project Funding Class: 320
(3) Project CWIS Number: 322416

b. Project Funds: Project Cost Estimate at March 2009 Price Level

Cost Estimate

Equipment	$54,000
Material	$154,000
Subtotal Construction Cost	**$208,000**
Supervision & Administration (6%)	$12,000
Contingency (10%)	$21,000
Total Construction Cost	**$241,000**
Engineering & Design (6%)	$14,000
Total Project Cost	**$255,000**
FEDERAL Share (80% Of Const) + Eng&Dgn	**$207,000**
SPONSOR Share (20% Of Const)	**$48,000**

c. Project Repair Schedule

The Work Window (work allowed in the water) is 15 June-31 August (odd years only). Work performed outside this window will only consist of work that is not in the water.

RESPONSIBLE PARTY	MILESTONE TAKS	MILESTONE DATE
COE	PIR Approval	7 April 2009
COE	E&D complete	1 June 2009
COE	CA and LER Cert Documents to Public sponsor, and Designs for Review NLT	15 April 2009
Whatcom County	Sign CA by Public sponsor	30 April 2009
COE	Environmental Documentation	30 April 2009
Whatcom County	Public sponsor certifies lands	15 May 2009
Whatcom County	Public sponsor provides cash contribution	15 May 2009
COE	RE Division Certifies Lands Available	17 June 2009
COE	Solicit contractors	22 June 2009
COE	Initiate (rental equipment) construction	20 July 2009
COE	Complete Construction	28 August 2009

d. Project Authentication

Project Management	Les Soule	(206) 764-3699
Emergency Management approval	Paul Komoroske	(206) 764-3406

e. Technical Points of Contact

Emergency Management	Doug Weber	(206) 764-3406
Economics	Don Bisbee	(206) 764-3713
Environmental	Jeff Dillon	(206) 764-6174
	Jeff Laufle	(206) 764-6578
Cultural Resources	Kat Kelly	(206) 764-7857
Engineering and Design	Cathie Desjardin	(206) 764-3542
Program Management	Doug Weber	(206) 764-3406
Real Estate	Kevin Kane	(206) 764-6652
Hydraulics and Hydrology	Travis Ball	(206) 764-3277
	Zac Corum	(206) 764-6581

APPENDICES
Appendix A: Project Sponsor's request for Rehabilitation Assistance

WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT
FRANK M. ABART
Director

RIVER AND FLOOD
322 N. Commercial Street, Suite 120
Bellingham, WA 98225
Phone: (360) 676-6876, (360) 398-1310
Fax: (360) 738-2468
www.whatcomcounty.us

February 6, 2009

Doug Weber
US Army Corps of Engineers
P.O. Box C-3755
4735 E. Marginal Way S.
Seattle, WA 98124-2255

Re: Levee Repair Work in Whatcom County

Dear Mr. Weber:

During the recent January flood event in Whatcom County there were multiple levee segments that were damaged. They include the following:

- The Guide-Meridian Levee – two breaches, both approximately 100-ft. on this levee segment south of B/C Avenue.
- The Bylsma Levee – an approximately 75-ft. section of this levee was damaged near Bylsma Road.
- The River Road Levee – an approximately 150-ft. section of this levee was breached adjacent to River Road. In addition, multiple sections of this levee in the vicinity of the breach experienced significant seepage thru the levee prism.
- Hovander Park Levee – an approximately 150-ft. section of this levee near Hovander Park was damaged, with significant erosion on the face of the levee. In addition, there are multiple locations of backslope damage throughout the levee segment.
- Rainbow Slough Levee – multiple breaches of this levee near the downstream end of the levee segment.

We are requesting ACOE assistance under the PL84-99 Program in implementing a repair project at this location. Whatcom County will act as the local sponsor and provide all necessary lands, rights-of-way, and easements for this project.

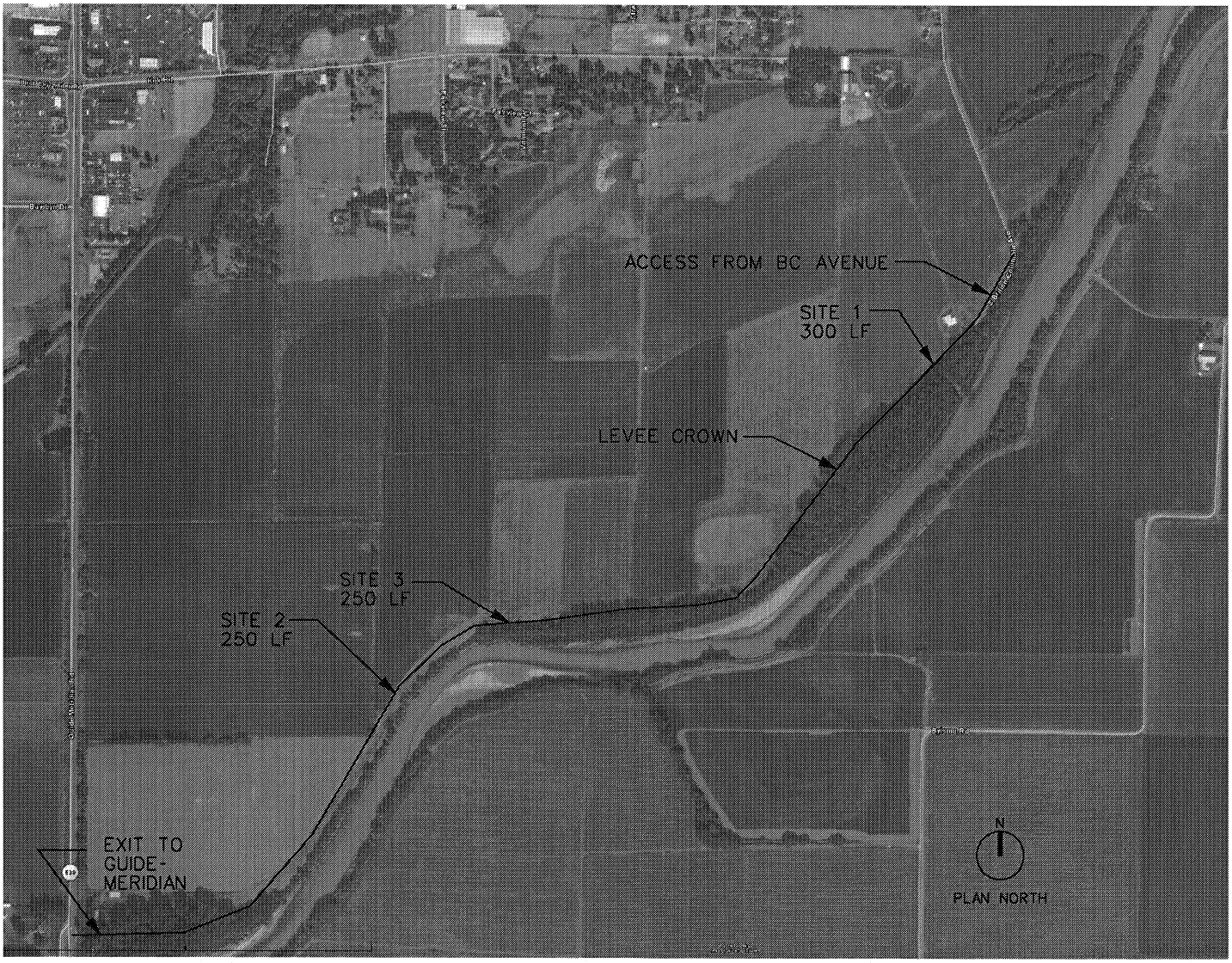
If you have any questions or need any additional information please contact me at (360) 676-6876.

Sincerely,

James E. Lee, P.E,
River and Flood Engineer

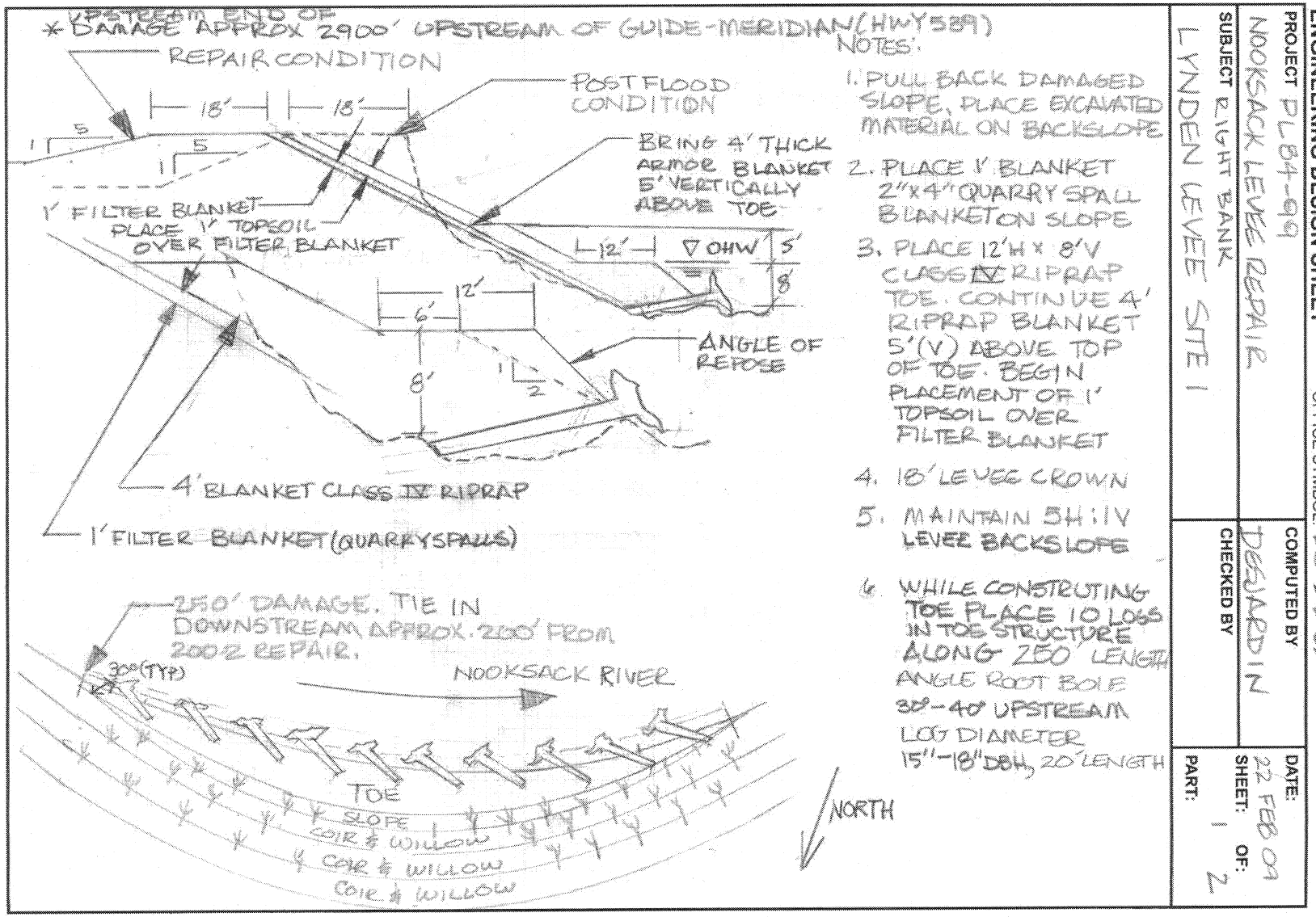
I:\FLOOD\112 - General Flood Works (Projects)\R & M Proj\2009\ACOE Levee Repairs\ACOE Request Letter (020609).docx

Appendix B: Project location and design data, maps, and related information



(Google Earth 2007: Annotated by Corps, 2009)

The levee is located on the right bank of the Nooksack River in Whatcom County, WA (Sections 20 and 30, Township 40 North, Range 3 East, Willamette Meridian)

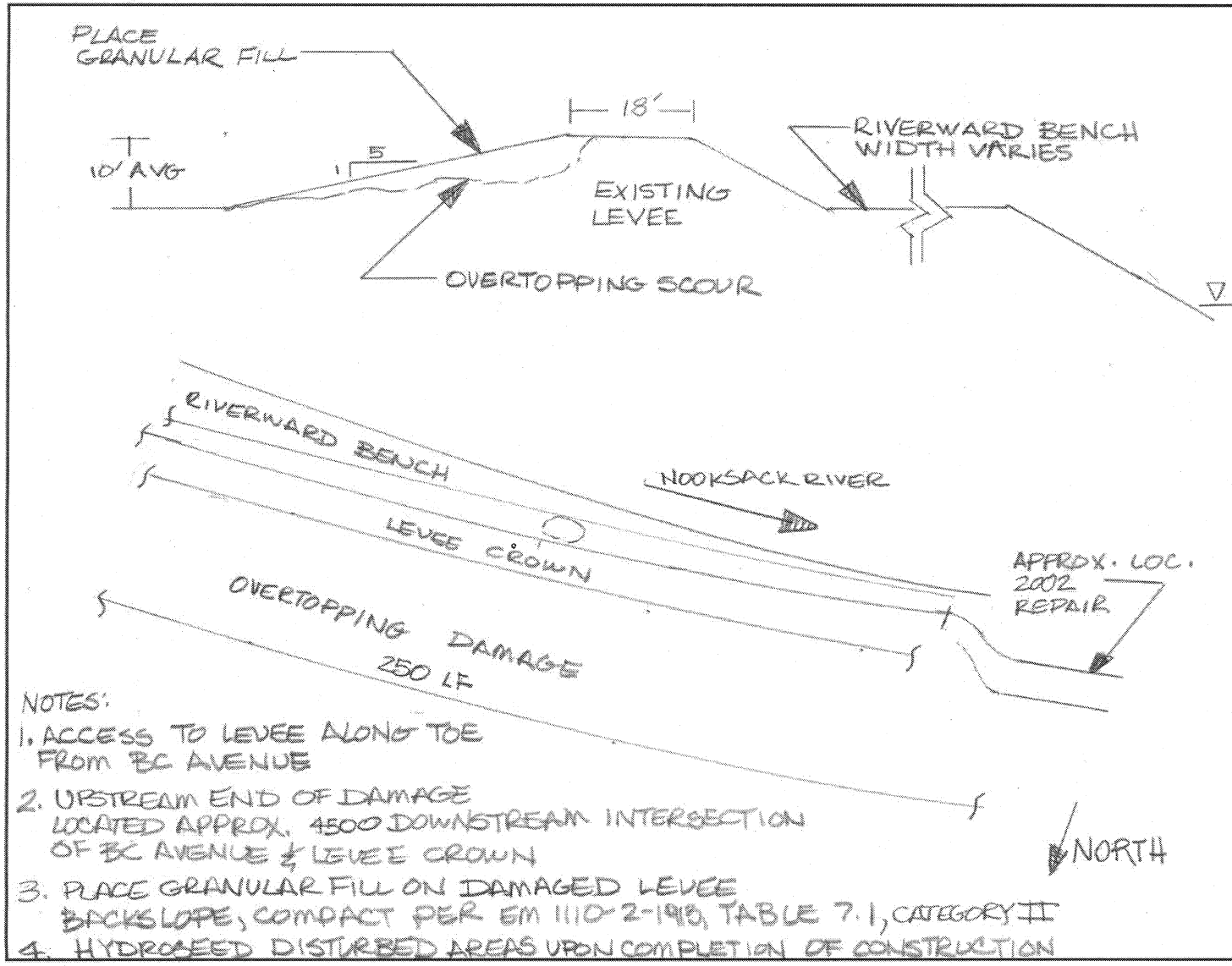


NOTES:

1. PULL BACK DAMAGED SLOPE, PLACE EXCAVATED MATERIAL ON BACKSLOPE
2. PLACE 1' BLANKET 2"x4" QUARRY SPALL BLANKET ON SLOPE
3. PLACE 12'W x 8'V CLASS IV RIPRAP TOE. CONTINUE 4' RIPRAP BLANKET 5'(V) ABOVE TOP OF TOE. BEGIN PLACEMENT OF 1' TOPSOIL OVER FILTER BLANKET
4. 18' LEVEE CROWN
5. MAINTAIN 5H:1V LEVEE BACKSLOPE
6. WHILE CONSTRUTING TOE PLACE 10 LOGS IN TOE STRUCTURE ALONG 250' LENGTH ANGLE ROOT BOLE 30°-40° UPSTREAM LOG DIAMETER 15"-18" DBH, 20' LENGTH

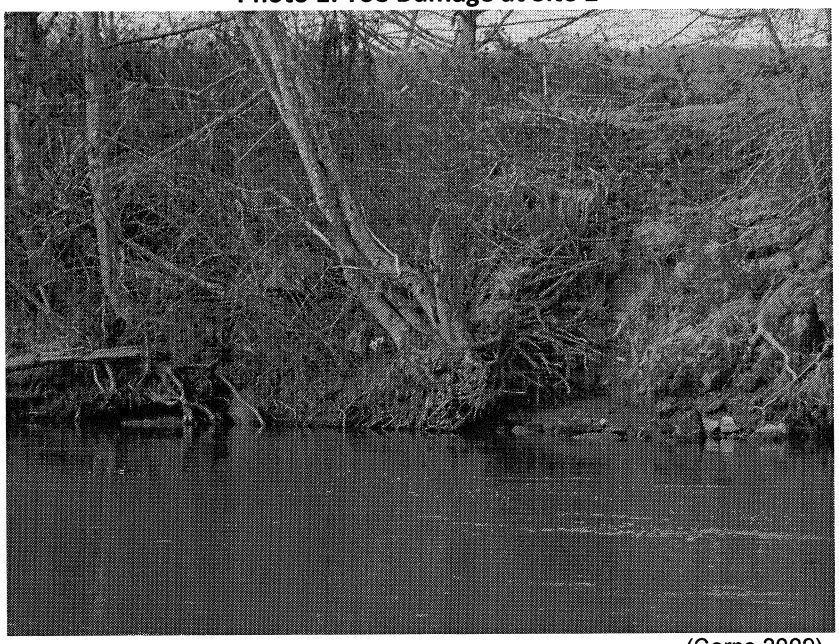
ENGINEERING DESIGN SHEET — OFFICE SYMBOL: EC/DB'09

PROJECT: PL84-99 NOOKSACK LEVEE REPAIR	COMPUTED BY: DESJARDIN	DATE: 22 FEB 09
SUBJECT: RIGHT BANK LYNDEN LEVEE SITE 1	CHECKED BY:	SHEET: 1 OF: 2
		PART:


PLACE GRANULAR FILL
18'
10' AVG
5
1
EXISTING LEVEE
RIVERWARD BENCH WIDTH VARIES
OVERTOPPING SCOUR
RIVERWARD BENCH
NOOKSACK RIVER
LEVEE CROWN
APPROX. LOC. 2002 REPAIR
OVERTOPPING DAMAGE 250 LF
NOTES:
1. ACCESS TO LEVEE ALONG TOE FROM BC AVENUE
2. UPSTREAM END OF DAMAGE LOCATED APPROX. 4500 DOWNSTREAM INTERSECTION OF BC AVENUE & LEVEE CROWN
3. PLACE GRANULAR FILL ON DAMAGED LEVEE BACKSLOPE, COMPACT PER EM 1110-2-1913, TABLE 7.1, CATEGORY II
4. HYDROSEED DISTURBED AREAS UPON COMPLETION OF CONSTRUCTION
NORTH
ENGINEERING DESIGN SHEET
OFFICE SYMBOL:
PROJECT PL 84-99 NOOKSACK RIVER REPAIR
SUBJECT RIGHT BANK LYNDEN LEVEE SITE 2
COMPUTED BY DGW/DJN
CHECKED BY
DATE: 22 FEB 09
SHEET: 2 OF: 2
PART:

Appendix D: Damages

Photo 1: Toe Damage at Site 2



(Corps 2009)

Photo 2: Backslope Damage at Site 3

(Corps 2009)

Appendix Z: PIR Review Checklist

Note: The Guide-Meridian Levee was mistakenly referred to as the "Lynden Levee" early in the PIR process.

EP 500-1-1
30 Sep 01 Lynden Levee

PIR Review Checklist for FCW Rehabilitation Projects

	YES	NO	N/A	
1.	X			The project is active in the RIP. [ER, 5-2.a.]
2.	X			The project was damaged by flood(s) or coastal storm(s). [ER, 5-2.]
3.	X			The Public Sponsor has requested Rehabilitation Assistance in writing. [EP, 5-10.b.]
4.	X			The Public Sponsor has agreed to sign the Cooperation Agreement, which will occur before USACE begins rehabilitation work. [ER, 5-10.]
5.	X			The estimated construction cost of the rehabilitation is greater than $15,000, and is not considered sponsor maintenance. [ER, 5-2.q.]
6.	X			The repair option selected is the option that is the least cost to the Federal government, or, the sponsor's preferred alternative is selected with all increases in cost paid by the public sponsor. PIR includes justification for non-select of the least cost alternative. [ER, 5-2.h. and 5-11.e.(3)]
7.	X			The public sponsor is aware of the opportunity to seek a nonstructural alternative project, and has decided to proceed with a structural rehabilitation. [ER, 5-16]
8.	X			The cost estimate in the PIR itemized the work to identify the Public Sponsor's cost share. [ER, 5-11]
9.	X			The rehabilitation project has a favorable benefit cost ratio of greater than 1.0:1. [ER, 5-2.r.]
10.	X			The proposed work will not modify the FCW to increase the degree of protection or capacity, or to provide protection to a larger area. [ER, 5-2.n.]
11.			N/A	Betterments are paid 100 percent by the Public Sponsor. [5-2.o.]
12.	X			The CA contains a provision for 80% Federal and 20% local cost share for non-Federal projects. [ER, 5-11.a.]
13.			N/A	Cost for any betterments are identified separately in the cost estimate. [ER, 5-2.o.]

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects

PIR Review Checklist for FCW Rehabilitation Projects (Continued)

	YES	NO	N/A	
14.	___	___	N/A	Repair of deliberate levee cuts is the responsibility of the public sponsor, except as provided for in ER 500-1-1, paragraphs 5-2.j. and 4-3.h. [ER, 5-2.j. and 4-3.h.]
15.	X	___		All deficient and deferred maintenance will be paid for or accomplished by the Public Sponsor, without receiving credit toward any sponsor's cost share. [ER, 5-2.g.]
16.	X	___	___	Any relocation of levees is adequately justified. [ER, 5-2.h.]
17.	X	___		USACE assistance does not correct design or construction deficiencies. [ER, 5-12.a.]
18.	X	___		An assessment of environmental requirements was completed. [ER, 5-13., and EP, Figure 5-3, paragraph 12.]
19.	X	___		The project complies with NEPA, and required documentation was completed and placed in Appendix G of the PIR. [ER, 2-3.k.; ER, 5-13.; and EP, Figure 5-3, paragraph 12.] NEPA documentation is ongoing.
20.	X	___		The Endangered Species Act was appropriately considered. [ER, 5-13.g., and EP, Figure 5-3., paragraph 12.] ESA consultation is ongoing.
21.	X	___		EO 11988 requirements were considered in the process of evaluating the proposed project for rehabilitation. [ER, 5-13.f., and EP, Figure 5-3, paragraph 12.]
22.	X	___		The completed PIR has been reviewed and the PIR Checklist has been reviewed and signed by the Emergency Management Office. [EP, 5-11.a.(3)(a)]
23.	X	___	___	The completed PIR meets all policy, procedural, content, and formatting requirements of ER 500-1-1 and EP 500-1-1. [ER, 2-3.b.]

EM REVIEWING OFFICIAL'S SIGNATURE

NAME
TITLE FCSCE Program Manager
TELEPHONE NUMBER
(206) 764-3406

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects (Continued)

RIVER ROAD LEVEE
PROJECT INFORMATION REPORT

PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
RIVER ROAD LEVEE
NSK-6-09

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PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
RIVER ROAD LEVEE
NSK-6-09

EXECUTIVE SUMMARY

PROJECT NAME: River Road Levee

PROJECT FUNDING CLASS: 320

PROJECT CWIS NUMBER: 322422

PUBLIC SPONSOR: Whatcom County Flood Control Zone District

LOCATION AND DESCRIPTION
The levee is located on the right bank of the Nooksack River near Lynden, Washington between river mile (RM) 13.5 and RM 15.3. Along most of the levee reach, there is a riverward bench. The levee consists of silty, sandy gravel with armor rock protection. Prior to the flood, the River Road Levee provided approximately a 20-year level of protection. The levee is about 10,400 linear feet (LF).

DESCRIPTION OF DAMAGE
The January 2009 flood event, which ranged from a 15-year flood at the Cedarville gage (RM 31) to a 27-year flood at Ferndale (RM 6), overtopped the levee resulting in a 200 foot breach, backslope scour and severe piping between RM 14.25 and RM 15. Damage is concentrated at three locations, each approximately 400 LF. One 400 LF stretch includes the 200 LF breach, which was temporarily repaired by the Corps during a flood fight. In the current condition, the levee offers an estimated 2-year level of flood protection.

PROPOSED REPAIR
The recommended repair (the Repair In-Kind Alternative) would return the levee to the pre-flood condition. The repair entails rebuilding the three damaged levee sections. The total repair length is approximately 1,200 LF.

SUMMARIZED FINANCIAL AND ECONOMIC DATA (rounded to the nearest $1000):

Construction subtotal	$319,000
S&A (6% of construction subtotal)	$19,000
Contingency (10% of construction subtotal)	$32,000
Total Construction	$370,000
Engineering and Design (6% of total construction) (Fed Cost)	$22,000
Total Project Costs	$392,000
Federal Project Cost (80% of Construction + E&D)	$318,000
Public Sponsor Project Cost (20% of Construction)	$74,000
B/C ratio	2 to 1

POINT OF CONTACT: Doug Weber, CENWS-OD-EM, (206) 764-3406

PROJECT REPORT

1. Project Identification

Project Name: River Road Levee
Project Funding Class: 320
Project CWIS Number: 322422

2. Project Authority

Classification: Non-Federal
Authority: N/A
Estimated original cost of project: Unknown
Construction completion date of the original project: Unknown
Additional information regarding major modifications/improvements/betterments: PL 84-99 repairs carried out in 1975 and 1980.

3. Public Sponsor

a. Sponsor Identification: Whatcom County Flood Control Zone District
POC for Whatcom County: Christina Schoenfelder
Whatcom County Public Works Department
River and Flood Division
322 N. Commercial Street, Suite 120
Bellingham, WA 98225
(360) 676-6876

b. Application for Assistance:
(1) Date of Issuance of District's Public Notice: 13 January 2009
(2) Date of Public Sponsor's written request (see Appendix A): 6 February 2009

4. Project Location

City: Lynden
County: Whatcom
State: Washington
Basin: Nooksack
River: Nooksack River
River Mile: 13.5 to 15.3
River Bank: Right (see map, Appendix B)

5. Project Design

This non-federal rural levee was constructed to provide protection from recurring flooding from the Nooksack River near Lynden in Whatcom County, Washington. Most of the River Road Levee is set back from the existing riverbank. Between the levee and the Nooksack River, there is a vegetated bench, which provides added channel capacity and environmental benefits. The levee is approximately 10,400 linear feet and is 5 to 10 feet high on the landward side; landward slopes are typically 3H:1V. The top width is approximately 12 ft. The landward slope and levee crown have a well established sod cover. The riverward slope typically ranges from 2H:1V to 1.5H:1V. The levee is predominantly composed of silty, sandy gravel riverbed material. The levee was designed with armor rock protection along the river. The setback sections do not have armor protection. Prior to the flood, the River Road Levee provided approximately a 20-year level of protection.

6. Disaster Incident

Between 7 and 10 January 2009, heavy rains and warm winds of subtropical origin, antecedent low elevation snow and ice, and a series of high tides contributed to moderate to severe flooding in the Nooksack River valley, with damages from the headwaters to the river delta. A 15-year flood event occurred at the Cedarville gage, which increased in magnitude in the downstream direction until reaching a 27-year recurrence interval at Ferndale. For more information on the flood event, see Seattle District's EngLink Situation Reports for Winter Flood Event #3, January 2009.

7. Project Damages

Damage occurred at three sites on the levee, each approximately 400 LF. The upstream damage location includes a 200 LF breach that was temporarily repaired by the Corps during a flood fight. In all locations, overtopping waters resulted in severe piping and backslope scour. In its current condition, the levee offers an estimated 2-year level of flood protection.

8. Project Performance Data

There was a continuing eligibility levee inspection performed in November 2005. The levee was found to be in acceptable condition. The Sponsor expends approximately $2000 in annual maintenance for this levee. The levee is maintained with periodic vegetation cutting, gravel placement, and pre- and post-flood inspections to repair minor damages. The level of maintenance is consistent with Seattle District recommendations.

a. Inspection Results.
   (1) Date of last inspection: November 2005
   (2) Type of last inspection: CEI
   (3) Project condition code of last inspection: Acceptable
   (4) Status: Eligible

b. Sponsor's Annual O&M Costs: $2,000

c. Estimated Cost to Repair Maintenance Deficiencies: N/A

9. Project Alternatives Considered

Multiple alternatives were considered including the No-Action, Repair In-Kind, Set back and Non-Structural alternatives. At this stage in the project, a preliminary analysis has been performed on the following alternatives:

No Action Alternative

The No-Action alternative would leave the levee in its current damaged condition. This alternative was not considered further because of the high potential of flood damages to infrastructure, farmland, and homes protected by the River Road Levee.

Repair In-Kind Alternative

The recommended alternative is to repair the levee to its pre-flood condition. Repairs would entail rebuilding the three 400 LF damage sites, including tearing down and rebuilding the temporary repair.

Setback Alternative

Set back was considered but not selected. Much of the levee is currently set back. The downstream damage location is not set back; however due to its proximity to River Road, a set back at this location would result in additional real estate and road construction costs. While a more extensive setback plan was considered, the costs were too great relative to the economic benefits offered by repair of the levee.

Non-Structural Alternative
This alternative would relocate all existing structures, utilities and other infrastructure within the damage area protected by this section of levee. The costs associated with this alternative were deemed too high for the level of benefit associated with this alternative.

10. Recommended Alternative

A preliminary selection of a recommended alternative was made: the Repair In-Kind Alternative. Repairs would consist of reconstructing the levee prism at the three damage sites for a total repair length of approximately 1,200 feet. Three levee sections would be repaired, each 400 LF. The first repair (Section A) would include removing the flood repair rock, placing and compacting imported levee fill material within the original footprint, and placing a six inch gravel lift on the crown. No trees would be removed repairing this section. The second repair (Section B) would include excavating a 400 LF reach to grade, reworking the excavated material with imported material, and reconstructing the levee prism in compacted lifts on the original footprint. A six inch gravel lift would be placed on the crown. No trees would be removed repairing this section. The third repair (Section C) would include pulling back (landward) the crown of a 400 LF section of over-steepened embankment and placing the flood repair rock from Section A on the riverward embankment. All levee embankments would be graded 2H:1V. All disturbed areas would be hydroseeded with native seed upon completion of construction. Ten to twenty trees would be removed to complete the repair of Section C. Confirmation of the preferred alternative and finalization of the design, including NEPA/ESA required features, will occur during the NEPA process and before construction.

11. Lands, Easements, Rights-of-Way, Relocations, and Disposal areas (LERRD)

The River Road Levee Rehabilitation Effort is located on the right bank of the Nooksack River in Section 36, Township 40 North, Range 2 East, Willamette Meridian, in Whatcom County, Washington. The proposed Rehabilitation Effort would repair 1200 LF of the levee and would restore the levee to pre-flood condition (See, project map). Acquisition of additional perpetual property interests would be required if the proposed Rehabilitation Effort footprint exceeds the area covered by the Public Sponsor's existing perpetual levee easements, or if the existing easements do not provide the required interests in project lands.

In order to proceed with the Rehabilitation Effort, the Public Sponsor must make the required levee project lands available prior to solicitation for the construction contract. See the proposed project schedule under Section 15 of this report.

To meet the real estate requirements for the Rehabilitation Effort, the Public Sponsor would need to demonstrate that it has the real property interests listed below:

> PERPETUAL FLOOD PROTECTION LEVEE EASEMENT ESTATE
> A perpetual and assignable right and easement in the land delineated on the attached location map, Exhibit __, by this reference made a part hereof, to construct, maintain, repair, operate, patrol and replace a flood protection levee, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired.

Proposed access (both ingress and egress) to the Rehabilitation Effort site is available directly to the levee easement footprint from the River Road public right-of-way. The need for a perpetual road easement is not anticipated for this project.

Temporary Work Areas will be required to construct the proposed levee repairs. During the next project phase – Engineering and Design, the Public Sponsor will need to identify locations that provide adequate acreage for the required work areas. The Public Sponsor will need to demonstrate that it has the below real property interests for proposed Temporary Work Areas.

> TEMPORARY WORK AREA EASEMENT
> A temporary easement and right-of-way in, on, over, and across the land delineated on the attached location map, Exhibit __ (exhibit to be prepared in next phase), for a period not to exceed six (6) months, beginning with date possession of the land is granted to the Grantee for use by the United States, its representatives, agents, and contractors as a work area, including the right to deposit fill material thereon, move, store, and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the River Road Levee Project Rehabilitation, Job No. NSK-6-09, together with the right to trim, cut, fell, and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads.

The final location of temporary work areas required for the Rehabilitation Effort would be coordinated with the Public Sponsor and confirmed in the next project phase – Engineering and Design (E&D). Additionally, if the COE, Real Estate Division determines the Public Sponsor does not have adequate real property interests for the lands needed for the proposed Rehabilitation Effort, including additional damage not visible at the time of inspection because of the presence of vegetation, then acquisition of property interests may be necessary. The need for the Public Sponsor to acquire or cure its existing property interests could result in further delay of repairing the damaged levee as proposed in the project schedule – see Section 15 of this report.

As part of the land certification process for the Rehabilitation Effort, the Public Sponsor would need to provide title reports not more than 90 days-old at the time of land certification demonstrating its real property interests in the lands required for the proposed levee repairs.

Any questions regarding types of property interests needed for the proposed project should be coordinated with COE, Real Estate Division.

12. Economic Evaluation

This levee has been classified as non-federal rural levee in the PL 84-99 program. In its current damaged condition, the levee would be expected to provide a 2-year level of protection. Repairing the levee would restore flood protection for up to a 20-year event.

The economic evaluation was conducted in accordance with EP 500-1-1 and ER 500-1-1, prepared in a level of detail commensurate with the complexity of the project and the effect of particular benefits to the justification of the project. EP 500-1-1 states that the benefit-cost ratio (BCR) must be greater than 1. In order to have a proper BCR, benefits and costs must be converted to current annual benefits and current annual costs over the same period of time at the same price level. Costs are annualized over the project period of analysis at the current federal interest rate of 4.625 percent. Benefits are based on the expected flood damages prevented as a result of the project. In accordance with EP 500-1-1, the period of analysis for non-federal agricultural levees is determined by the period of time that is the least of

(1) With-Project level of protection (20 years);
(2) Remaining life of the project (50 years);
(3) Fifty year; or
(4) Maximum project life for non-federal agricultural levees (10 years).

The Period of analysis for the River Road levee is therefore 20 years.

The January 2009 event breached the River Road levee. Flood fighting efforts were successful in limiting the damages; however clean-up costs to the immediately adjacent farm were $3,000 and road repairs cost an additional $10,000. Since the resulting flood duration was relatively short, there was no significant flooding and no structures were flooded; however, the road supplies access to 9 homes and this access was cut off for several days. According to the county no emergency access was required nor did the residents take any action to evacuate so avoided emergency costs as benefits will not be claimed.

The River Road levee protects approximately 585 acres (.91 square miles) of farmland. At least one farm with a single-family residence and the Ferndale Ready Mix Plant are also in the floodplain. The principle crops are silage corn (64%), silage grass (30%), and raspberries (6%) grown by approximately 20 farmers. In the without-project, or the current damaged condition, this farmland would be expected to flood biannually. The best use of farmland flooded biannually is low quality pasture.

Table 1 below shows the with- and without-project land use for crops.

Table 1

With and Without Project Land Use			
Acres	**Percentage**	**Without Project Land Use**	**With project Land Use**
35	6%	Pastureland	Rasberries
375	64%	Pastureland	Silage Corn
175	30%	Pastureland	Silage Grass
585	**100%**	**Pastureland**	**Composite**

Detailed farm budget analysis is not possible within the constraints of the PL 84-99 program due to the quantity of new information that must be acquired for farming in this area. Estimated lease rates for land suitable for various crops have been obtained from Whatcom County agricultural extension agents and bankers. Assuming that farmers do not pay more for leasing the land than they expect to earn in income, lease rates provide a reasonable estimate of the change in income resulting from protecting land from annual flooding. This serves as a proxy for the more detailed and resource intensive methodology used in feasibility level study. Table 2 below provides estimates of valuations and lease rates[1] for the most typical crops in the County.

[1] Conversations with Whatcom County agricultural agents indicated potentially much higher land values, due to the high value of berry crops such as blueberries and raspberries of up to $30,000 per acre; however the higher prices appeared to be somewhat anomalous and not representative, so lower, more typical valuations, were used. There is not enough data (i.e. comparable sales) for more detailed statistical analysis.

Table 2

Agricultural Land Use Estimated Valuations			
	Average Per Acre Valuations	Range of Annual Lease Rates	Average Annual Lease Rate
Blueberries/Rasberries	$ 8,000	$350 to $450	$ 400
Silage Corn	$ 5,500	$200 to $300	$ 275
Silage Grass	$ 3,000	$100 to $200	$ 150
Unprotected Pastureland	$ 2,300	$80 to $150	$ 115

Restoring the River Road Levee to a 20-year level of protection would allow higher value crop production and land use to continue. Table 3 tabulates the project benefits that would accrue to farmland use.

Table 3

With Project Annual Benefits for Farm Land Use						
Acres	With project Land Use	Percentage	Without Project Annual Income per Acre	With Project Annual Income per Acre	With Project Per Acre Benefit	Total Annual Benefit
35	Rasberries	6%	$ 115	$ 400	$ 285	$ 9,975
375	Silage Corn	64%	$ 115	$ 275	$ 160	$ 60,000
175	Silage Grass	30%	$ 115	$ 150	$ 35	$ 6,125
585	**Composite**	**100%**	**$ 115**	**$ 245**	**$ 130**	**$ 76,100**

In addition to reduced value of cropland, the GIS map of the floodplain shows that there is at least one farm with some farm structures and a single family residence that would likely be flooded. Table 4 shows the estimated depreciated replacement and content values of the farm structures based on standard content-to-value ratios and County assessor information.

Table 4

Structures in Flood Plain	
Structure Type	Estimated Structure and Content Value
Single Family Residences	$ 119,915
Commercial Farm Structures	$ 22,486
Total	**$ 142,401**

Since models that predict depths are not available it has been assumed that a 2-year event that fails the levee would inundate the farm and structures with six inches of water and a 20-year event would inundate it with at least a foot of water. Table 5 summarizes the expected damages by category and flood event

Table 5

Estimated Flood Damages		
	Event	
Damage Category	2-year	20-year
Land Use	$ 76,100	$ 76,100
Structures	$ 42,578	$ 61,660
Road Repairs	$ 10,000	$ 10,000
Clean-up	$ 3,000	$ 3,000
Total	**$ 131,678**	**$ 150,760**

Integrating these expected damages over the range of probabilities from the 50% annual event to the 20-year or 5% annual event yields Expected Annual Damages or EAD. The EAD reduced by the project are the annual benefits Table 6 summarizes the with- and without-project condition expected annual damages (EAD) and the resulting EAD reduced or project annual benefits.

Table 6

Project Benefits		
Without Project EAD	With Project EAD	EAD Reduced
$70,148	$6,822	$63,325

Table 7 displays the costs, annualized costs, and benefits rounded to the nearest $1,000 with the resulting BCR.

Table 7

Annualized Costs and Benefit-Cost Ratio	
First Cost	**$ 392,000**
Annual Cost	
Interest and Amortization (20yrs. @4.625%)	$ 30,000
O&M[2]	$ 2,000
Total Annual Cost	**$ 32,000**
Annual Benefits	**$ 63,000**
Benefit-Cost Ratio	**2 to 1**

Distribution of project benefits

The protected area is owned by at least 15 farmers and the road supplies access to 9 homes. The individual farm with the farm structures and single family residence would incur 32%-40 % of the estimated monetary damages, so the portion of benefits received would be proportionate.

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[2] A detailed breakdown of the operation and maintenance costs for each levee is not available, but $2,000 per levee per year is a generally accepted estimate.

There are three checks required of PL 84-99 Project Information Reports (PIRs) to ensure economic viability. The first check is to ensure that the first cost of repairs does not exceed the value of property to be protected. The second check is to ensure that the annual benefits per acre should bear a reasonable relationship to the value of the cropland; annual benefits in excess of 5 percent of the value of the acreage are not usually reasonable. The third check is to ensure that the annual benefit per acre does not exceed the annual net income of that type of cropland. The second and third checks are specific to agricultural benefits only.

Table 8 below shows the land valuations by crop.

Table 8

Total Valuations				
Acres	With project Land Use	With Project Value/Acre	Total Value	5% of Total Value
35	Rasberries	$ 8,000	$ 280,000	14,000
375	Silage Grass	$ 3,000	$ 1,125,000	56,250
175	Silage Corn	$ 5,500	$ 962,500	48,125
Total Valuations	**Composite**	**$ 4,250**	**$ 2,087,500**	**104,375**

The following checks were performed:

1. Total estimated value of property

Land	$ 2,088,000
Buildings	$ 142,000
Total appraised value of affected parcels	$ 2,230,000

Check #1 is affirmative - First Cost of levee rehab is significantly less than the total value of property protected.

2. Value of cropland

Farm Land	585 acres
Value	$2,090,000
5% of Value	$105,000
Benefits per acre	$130

Check #2 is affirmative - $130 per acre in annual benefits is significantly less than 5 percent of the total value of the acreage.

3. Net Farm Income per acre (based on Whatcom County Agricultural Statistics, 1997 data, 2004 prices)

Income Per Acre	$653
Benefits Per Acre	$130

Check #3 is affirmative – The benefits of $130 per acre are significantly less than the average net farm income of $653 per acre.

13. Environmental

This levee is setback from the river for most of its repair length (see map, Appendix B). Vegetation is prevalent waterward of this levee. It appears as if the thalweg was once located against this levee reach

but has perhaps migrated towards the other shore. An unmaintained wooden wing wall constructed sometime in the middle to early 1900s remains along the waterward portion of the levee and may have contributed to the rivers migration. Large cottonwoods are present on the landward side of the levee at one location but are outside the project footprint.

In the project area the Nooksack River is a confined, single channel, low gradient system.

Potential Issues:

a. Water Quality. Water quality impacts are not anticipated from this project. Restoration of the levee prism would occur away from the active channel requiring no in-water work, except for the downstream-most 400 feet. In this location, work would remain out of the wetted channel but runoff is expected to be minimal and managed through BMPs such that water quality parameters are maintained. The new levee would be hydroseeded for erosion control.

b. Fish and Wildlife. Access is provided by existing roads that would not require substantial alteration to support the work. There is no in-water work proposed as part of this project. No direct impacts to aquatic resources are anticipated. Some areas would require removal of vegetation within the levee prism including mature riparian vegetation that has grown adjacent to the levee along the downstream 400 feet (Section C).

The river provides spawning and rearing for all salmon species utilizing the lower mainstem Nooksack. These species include Chinook, pink, chum, steelhead and large numbers of coho. The in-water construction work window for this project is 15 June through 31 August.

The following threatened species are expected to be found in the project area:

- Puget Sound Chinook salmon,
- Puget Sound steelhead, and
- Coastal/Puget Sound bull trout.

It is anticipated that marbled murrelet, listed as threatened, could transit the area while traveling between nesting areas in the upper watershed, and feeding areas in Puget Sound. Potential effects of the proposed work on threatened or endangered species and designated critical habitat will be addressed per Section 7 of the Endangered Species Act. Bald eagles may be present at the project site. These birds have been removed from the Endangered Species Act but remain protected under the Bald and Golden Eagle Protection Act so caution will be taken to avoid significant harm to the birds or their habitat. Other listed species in Whatcom County are Canada lynx, gray wolf, grizzly bear, and northern spotted owl; however, they are not expected to be present in the project area due to specialized habitat requirements, lack of tolerance for human activity, or both, so there would be no effect on them.

c. Wetlands. Construction activities will incorporate measures to avoid wetland impacts. There is a small semi-circular meadow landward of the levee prism consisting of reed canarygrass and blackberry. This small meadow is outside the proposed levee repairs and would not be impacted. It is not planned as a disposal or staging site but will be marked to prevent encroachment during construction. As long as work will not be done in waters of the U.S., which includes wetlands, a Sec. 404 evaluation is not required under the Clean Water Act, nor is a Sec. 401 water quality certification.

d. Navigable Waters. The river along this reach is navigable, but since there is no in-water work proposed, Sec. 10 evaluation is not required under the Rivers and Harbors Act.

e. Historic Properties Considerations. A search of the Washington State Department of Archaeology and Historic Preservation (DAHP) database was conducted on 20 February 2009 to identify any potential archaeological, National Register, or State Historical sites in the vicinity of the levee damage sites. The nearest recorded sites are within one quarter mile of the project area.

Prior to repairs, a Corps archeologist will conduct a cultural resources survey of the project area to determine whether there is a potential for the proposed repairs to cause effects to historic properties. National Historic Preservation Act Section 106 compliance reports will be prepared for all proposed 2009 levee repairs. The report will include the findings of the investigations for each repair site, recommendations for archaeological monitoring during construction, and a determination of effects to archaeological and historic properties. If archaeological monitoring is recommended at some repair locations, the report will include a monitoring plan and protocols to be followed. The protocols will include an inadvertent discovery clause that will apply when an archaeological monitor is not present. The Corps' determinations of effects to historic properties, the investigation report, and monitoring plan will be reviewed and approved by the Washington State Historic Preservation Officer (SHPO) and the appropriate tribes prior to construction.

f. Recreation. This section of levee is not considered a recreational area. Off-road vehicles have utilized the levee and areas between it and river for recreation. Erosion to the levee prism and disruption to the riparian corridor is evident. This activity should be precluded following the proposed project to maintain levee integrity and protect the riparian corridor.

g. Cumulative Effects. Cumulative effects will be addressed as required under NEPA and ESA.

h. Coordination. The proposed work is formally coordinated throughout the planning, design, and construction phases with the following agencies:

(1) U.S. Fish and Wildlife Service;
(2) NOAA Fisheries;
(3) Environmental Protection Agency;
(4) Washington Department of Fish and Wildlife;
(5) Washington Department of Ecology;
(6) Nooksack Tribe;
(7) Lummi Tribe; and
(8) State Historic Preservation Office.

Their recommendations will be considered and implemented as appropriate. In accordance with ER200-2-2, Procedures for Implementing NEPA, paragraph 8, Emergency Actions the environmental effects of the proposed levee rehabilitation will be considered during the planning process. An environmental assessment (EA) will be prepared to evaluate probable impacts of the project on the existing environment. Factors addressed by the evaluation include public safety, water quality, wetlands, threatened and endangered species, noise, economics, fish, and wildlife. The EA will be coordinated with applicable Federal and State resource agencies. The NEPA process will be concluded pursuant to requirements in ER 200-2-2. NEPA documentation is anticipated to finish approximately 84 days after the project begins. This process includes compliance with the Endangered Species Act. According to the Code of Federal Regulations Title 33, Section 323.4(a)(2), emergency reconstruction of recently damaged parts of levees does not require a Section 404 evaluation provided that the work does not include any modification that changes the character, scope, or size of the original fill design. The proposed repair may require a Section 404 evaluation if the footprint of the levee repair falls within waters of the United States beyond the pre-

damage footprint. If a Section 404 evaluation is not required, a Section 401 water quality certification from the Washington Department of Ecology would also not be required. The size of this project may require an NDPES permit prior to construction. A determination of consistency with state and county shoreline management plans pursuant to the Coastal Zone Management Act will be needed.

i. Environmental enhancement features. Project construction may include environmental enhancement features to offset temporary construction impacts. The identification and coordination of any necessary features to offset construction impacts will be addressed during E&D. To further protect environmental resources the beginning and end location of each segment will be field marked sufficiently to last the entire construction period.

14. Interagency Levee Task Force

HQUSACE has not directed activation of an Interagency Levee Task Force for the flood event associated with the January 2009 flood event in Western Washington. However, informal coordination with FEMA is ongoing.

15. Project Management

a. Funding Authority
   (1) Program and Appropriation: FC&CE 3125
   (2) Project Funding Class: 320
   (3) Project CWIS Number: 322422

b. Project Funds: Project Cost Estimate at March 2009 Price Level

The cost estimate is presented by the details of each damage site first, followed by a project summary table that adds supervision and administration (S&A), contingency, and engineering and design (E&D).

Table 9 – Project Cost Estimate

Equipment	$71,000
Material	$247,000
Subtotal Construction Cost	**$319,000**
Supervision & Administration (6%)	$19,000
Contingency (10%)	$32,000
Total Construction Cost	**$370,000**
Engineering & Design (6%)	$22,000
Total Project Cost	**$392,000**
FEDERAL Share (80% of Total Construction + E&D)	**$318,000**
SPONSOR Share (20% of Total Construction)	**$74,000**

c. Project Repair Schedule

Table 10 - Project Repair Schedule

RESPONSIBLE PARTY	MILESTONE TAKS	MILESTONE DATE
COE	PIR Approval	17 April 2009
COE	E&D complete	1 June 2009
COE	CA and LER Cert Documents to Public Sponsor, and Designs for Review NLT	29 April 2009
Public Sponsor	Public Sponsor signs CA	22 May 2009
COE	Environmental Documentation	1 June 2009
COE	DE signs CA	3 June 2009
Public Sponsor	Public Sponsor certifies lands	8 June 2009
Public Sponsor	Public Sponsor provides cash contribution	17 June 2009
COE	RE Division Certifies Lands Available	8 July 2009
COE	Solicit contractors	9 July 2009
COE	Initiate (rental equipment) construction	30 July 2009
COE	Complete Construction	28 September 2009

d. Project Authentication

Project Management	Lester Soule	(206) 764-3699
Emergency Management approval	Paul Komoroske	(206) 764-3406

e. Technical Points of Contact

Emergency Management	Doug Weber	(206) 764-3406
Economics	Don Bisbee	(206) 764-3713
Environmental	Jeff Dillon	(206) 764-6174
	Jeff Laufle	(206) 764-6578
Cultural Resources	Kat Kelly	(206) 764-7857
Engineering and Design	Cathie Desjardin	(206) 764-3542
Program Management	Doug Weber	(206) 764-3406
Real Estate	Kevin Kane	(206) 764-6652
Hydraulics and Hydrology	Travis Ball	(206) 764-3277
	Zac Corum	(206) 764-6581

APPENDICES

Appendix A: Project Sponsor's request for Rehabilitation Assistance

WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT
FRANK M. ABART
Director

RIVER AND FLOOD
322 N. Commercial Street, Suite 120
Bellingham, WA 98225
Phone: (360) 676-6876, (360) 398-1310
Fax: (360) 738-2468
www.whatcomcounty.us

February 6, 2009

Doug Weber
US Army Corps of Engineers
P.O. Box C-3755
4735 E. Marginal Way S.
Seattle, WA 98124-2255

Re: Levee Repair Work in Whatcom County

Dear Mr. Weber:

During the recent January flood event in Whatcom County there were multiple levee segments that were damaged. They include the following:

- The Guide-Meridian Levee – two breaches, both approximately 100-ft. on this levee segment south of B/C Avenue.
- The Bylsma Levee – an approximately 75-ft. section of this levee was damaged near Bylsma Road.
- The River Road Levee – an approximately 150-ft. section of this levee was breached adjacent to River Road. In addition, multiple sections of this levee in the vicinity of the breach experienced significant seepage thru the levee prism.
- Hovander Park Levee – an approximately 150-ft. section of this levee near Hovander Park was damaged, with significant erosion on the face of the levee. In addition, there are multiple locations of backslope damage throughout the levee segment.
- Rainbow Slough Levee – multiple breaches of this levee near the downstream end of the levee segment.

We are requesting ACOE assistance under the PL84-99 Program in implementing a repair project at this location. Whatcom County will act as the local sponsor and provide all necessary lands, rights-of-way, and easements for this project.

If you have any questions or need any additional information please contact me at (360) 676-6876.

Sincerely,

James E. Lee, P.E,
River and Flood Engineer

I:\FLOOD\112 - General Flood Works (Projects)\R & M Proj\2009\ACOE Levee Repairs\ACOE Request Letter (020609).docx

Appendix B: Project location and design data, maps, and related information

(Google Earth 2007: Annotated by Corps, 2009)

Whatcom County, WA: Section 36, Township 40 North, Range 2 East, Willamette Meridian

NOTES:

1. THREE 400 FT. SITES REQUIRE REPAIR.

US Army Corps of Engineers Seattle District

U.S.ARMY ENGINEER DISTRICT,SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON

Prepared by: DES.JARDIN

Designed by: DES.JARDIN

Drawn by: F.FISCHER

Date: APR 2009

Scale: As noted

PL 84-99 LEVEE REHABILITATION NOOKSACK RIVER

RIVER ROAD PLAN VIEW

WHATCOM COUNTY WA

Plate number: C-101

Sheet 1 of 3

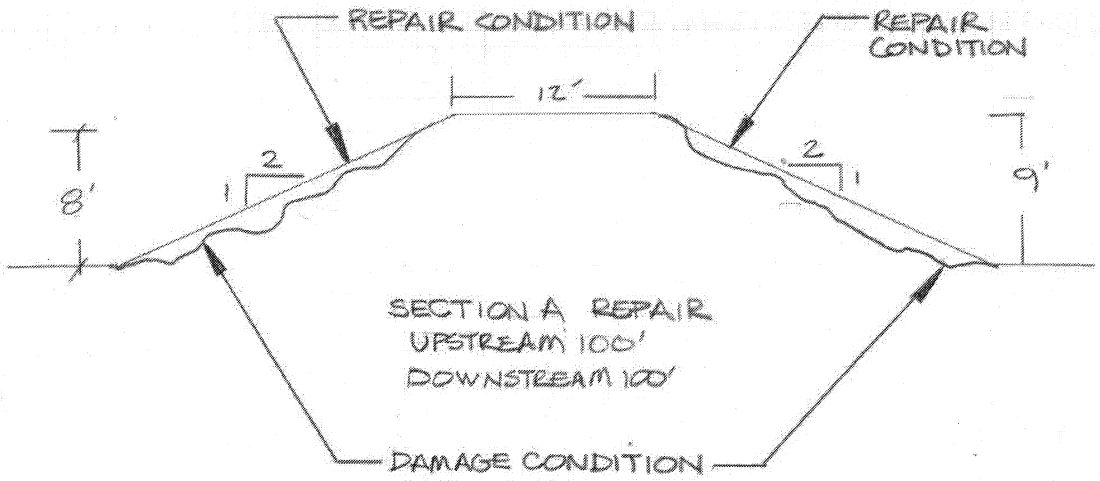
DESIGN FILE: ########

DATE AND TIME PLOTTED: ########

(Google Earth 2007: Annotated by Corps, 2009)

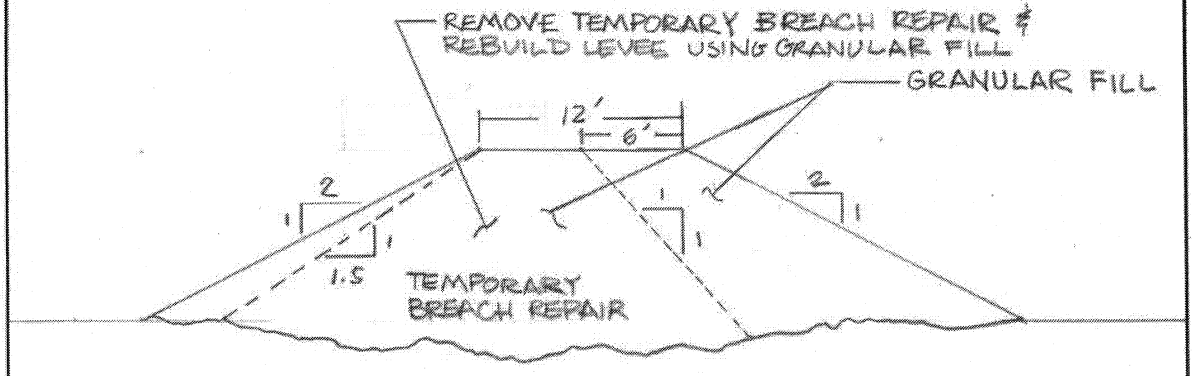
ENGINEERING DESIGN SHEET OFFICE SYMBOL: EC-DB-05

PROJECT	COMPUTED BY	DATE:
2009 WHATCOM COUNTY LEVEE REPAIR	DESJARDIN	6 APR 09 SHEET: 2 OF: 3
SUBJECT	CHECKED BY	PART:
RIVER ROAD		



NOTES:

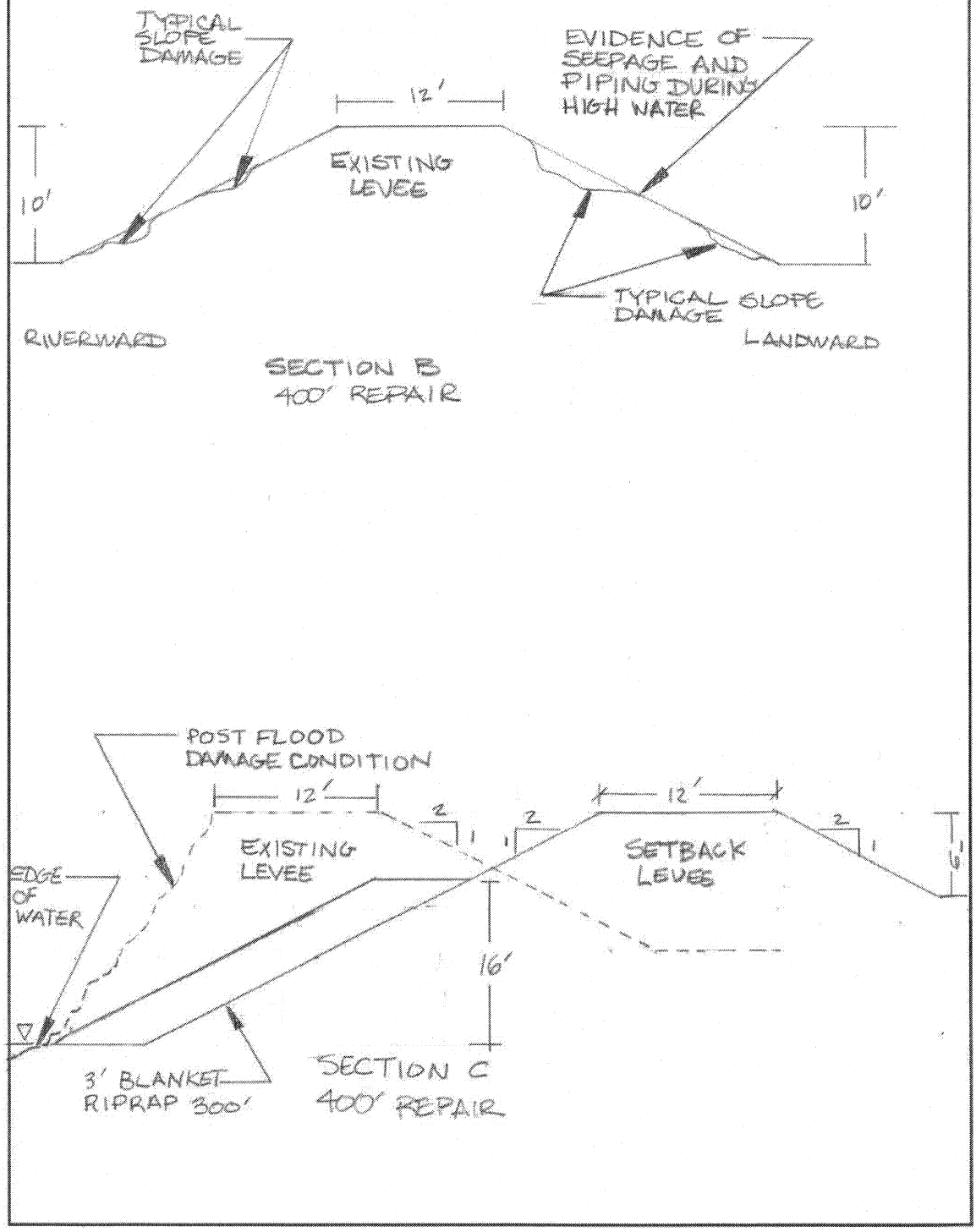
1. REMOVE BREACH REPAIR ROCK & REBUILD LEVEE.
2. PLACE GRANULAR FILL & COMPACT PER EM 1110-2-913 TABLE 7-1 CATEGORY II
3. HYDROSEED ALL DISTURBED AREAS UPON COMPLETION OF CONSTRUCTION



BREACH REPAIR
SECTION A 2005

ENGINEERING DESIGN SHEET OFFICE SYMBOL: EC/DB/CG

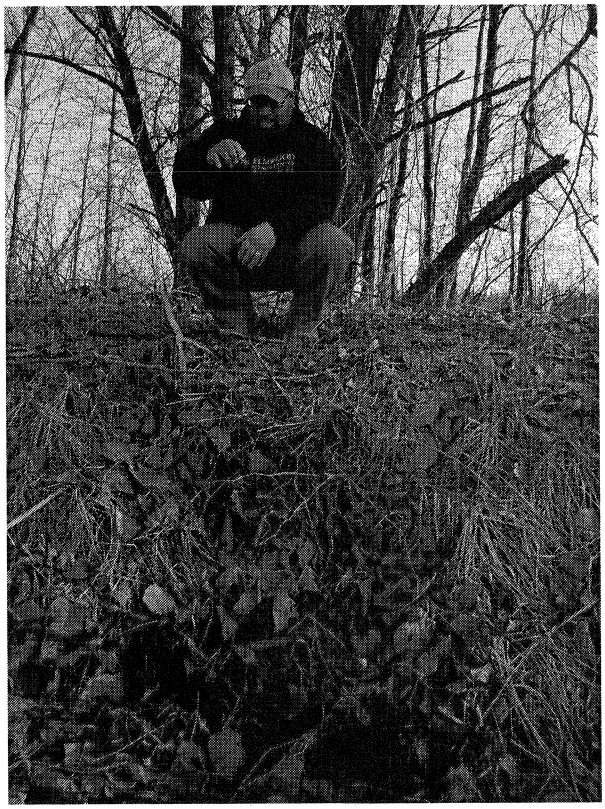
PROJECT 2009 WHATCOM COUNTY LEVEE REPAIR	COMPUTED BY DESJARDIN	DATE: 7 APR 09
SUBJECT RIVER ROAD	CHECKED BY	SHEET: 3 OF: 3 PART:



Note: The repair would not be setting back Section C – just the top would be pulled back to make the slope less steep.

Appendix D: Damages

Photo 1



Backslope scour (Corps 2009)

Photo 2

Seepage exit hole on backslope (Corps 2009)

Appendix Z: PIR Review Checklist

EP 500-1-1
30 Sep 01

River Road

PIR Review Checklist for FCW Rehabilitation Projects

	YES	NO	N/A	
1.	X			The project is active in the RIP. [ER, 5-2.a.]
2.	X			The project was damaged by flood(s) or coastal storm(s). [ER, 5-2.]
3.	X			The Public Sponsor has requested Rehabilitation Assistance in writing. [EP, 5-10.b.]
4.	X			The Public Sponsor has agreed to sign the Cooperation Agreement, which will occur before USACE begins rehabilitation work. [ER, 5-10.]
5.	X			The estimated construction cost of the rehabilitation is greater than $15,000, and is not considered sponsor maintenance. [ER, 5-2.q.]
6.	X			The repair option selected is the option that is the least cost to the Federal government, or, the sponsor's preferred alternative is selected with all increases in cost paid by the public sponsor. PIR includes justification for non-select of the least cost alternative. [ER, 5-2.h. and 5-11.e.(3)]
7.	X			The public sponsor is aware of the opportunity to seek a nonstructural alternative project, and has decided to proceed with a structural rehabilitation. [ER, 5-16]
8.	X			The cost estimate in the PIR itemized the work to identify the Public Sponsor's cost share. [ER, 5-11]
9.	X			The rehabilitation project has a favorable benefit cost ratio of greater than 1.0:1. [ER, 5-2.r.]
10.	X			The proposed work will not modify the FCW to increase the degree of protection or capacity, or to provide protection to a larger area. [ER, 5-2.n.]
11.			N/A	Betterments are paid 100 percent by the Public Sponsor. [5-2.o.]
12.	X			The CA contains a provision for 80% Federal and 20% local cost share for non-Federal projects. [ER, 5-11.a.]
13.			N/A	Cost for any betterments are identified separately in the cost estimate. [ER, 5-2.o.]

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects

PIR Review Checklist for FCW Rehabilitation Projects (Continued)

	YES	NO	N/A	
14.	___	___	N/A	Repair of deliberate levee cuts is the responsibility of the public sponsor, except as provided for in ER 500-1-1, paragraphs 5-2.j. and 4-3.h. [ER, 5-2.j. and 4-3.h.]
15.	X	___		All deficient and deferred maintenance will be paid for or accomplished by the Public Sponsor, without receiving credit toward any sponsor's cost share. [ER, 5-2.g.]
16.	X	___	___	Any relocation of levees is adequately justified. [ER, 5-2.h.]
17.	X	___		USACE assistance does not correct design or construction deficiencies. [ER, 5-12.a.]
18.	X	___		An assessment of environmental requirements was completed. [ER, 5-13., and EP, Figure 5-3, paragraph 12.]
19.	X	___		The project complies with NEPA, and required documentation was completed and placed in Appendix G of the PIR. [ER, 2-3.k.; ER, 5-13.; and EP, Figure 5-3, paragraph 12.] NEPA Documentation is ongoing.
20.	X	___		The Endangered Species Act was appropriately considered. [ER, 5-13.g., and EP, Figure 5-3., paragraph 12.] ESA Consultation is ongoing
21.	X	___		EO 11988 requirements were considered in the process of evaluating the proposed project for rehabilitation. [ER, 5-13.f., and EP, Figure 5-3, paragraph 12.]
22.	X	___		The completed PIR has been reviewed and the PIR Checklist has been reviewed and signed by the Emergency Management Office. [EP, 5-11.a.(3)(a)]
23.	X	___	___	The completed PIR meets all policy, procedural, content, and formatting requirements of ER 500-1-1 and EP 500-1-1. [ER, 2-3.b.]

EM REVIEWING OFFICIAL'S SIGNATURE

David J. Webb

NAME

TITLE Program Manager

TELEPHONE NUMBER

(206) 764-3406

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects (Continued)

5-23

HOVANDER PARK LEVEE
PROJECT INFORMATION REPORT

PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
HOVANDER PARK LEVEE
NSK-3-09

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PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
HOVANDER PARK LEVEE
NSK-3-09

EXECUTIVE SUMMARY

PROJECT NAME: Hovander Park Levee

PROJECT FUNDING CLASS: 320

PROJECT CWIS NUMBER: 322415

PUBLIC SPONSOR: Whatcom County Flood Control Zone District

LOCATION AND DESCRIPTION

The levee is located on the left bank of the Nooksack River near Ferndale, Washington between river mile (RM) 5.7 and RM 3.5, approximately 12,000 LF. For the most part, the levee is set back some distance from the river bank. However, there are areas that the levee is adjacent. The levee varies in height from 6 to 8 feet and is designed with an overtopping back slope of approximately 5H:1V. The embankment material consists of local borrow material with armor rock protection where adjacent to the river. This levee is designed for a 15-year level of protection.

DESCRIPTION OF DAMAGE

The January 2009 flood event ranged from a 15-year event at the Cedarville gage (RM 31) to a 27-year event at Ferndale (RM 6). At Site 1, flood flows scoured approximately 200 LF of the toe and slope protection, and about half of the riverward levee prism. Overtopping caused back slope scour and loss of embankment. At Site 2, six (6) locations totaling 700 LF experienced back slope scouring from river overtopping. In the current condition, the levee offers 2-year flood protection.

PROPOSED REPAIR

The recommended alternative is to set the levee back for approximately 940 LF and repair approximately 700 LF of the back slope. This alternative is more costly than the repair in-kind alternative but is the locally preferred alternative. The local sponsor is willing to pay the additional costs over the least cost alternative. Repairs will return the levee to the pre-flood level of protection.

SUMMARIZED FINANCIAL AND ECONOMIC DATA:

	Least-Cost Plan (Repair In-Kind Alternative)	Recommended Plan (Setback Alternative)
Construction subtotal	$240,000	$370,000
S&A (6% of construction subtotal)	$14,000	$22,000
Contingency (10% of construction subtotal)	$24,000	$37,000
Total Construction Cost	$278,000	$429,000
Engineering and Design (6% of total construction) (Federal Cost)	$17,000	$26,000
Total Project Costs	$295,000	$455,000
Federal Project Cost	$239,000	$248,000**
Sponsor Project Cost	$56,000	$207,000
B/C ratio	2.9 to 1	N/A***

**Federal Project Costs = 80% of Least-Cost Plan + E&D of Recommended Plan

***Environmental benefits are assumed to exceed incremental setback costs

POINT OF CONTACT: Doug Weber, CENWS-OD-EM, (206) 764-3406

PROJECT REPORT

1. Project Identification

Project Name: Hovander Park Levee
Project Funding Class: 320
Project CWIS Number: 322415

2. Project Authority

Classification: Non-Federal
Authority: N/A
Estimated original cost of project: Unknown
Construction completion date of the original project: Unknown
Additional information regarding major modifications/improvements/betterments: PL 84-99 repairs were carried out in 1975 and 1997.

3. Public Sponsor

a. Sponsor Identification: Whatcom County Flood Control Zone District
POC for Whatcom County: Christina Schoenfelder
Whatcom County Public Works Department
River and Flood Division
322 N. Commercial Street, Suite 120
Bellingham, WA 98225
(360) 676-6876

b. Application for Assistance:
(1) Date of Issuance of District's public Notice: 13 January 2009
(2) Date of Public sponsor's written request: (see Appendix A): 6 February 2009

4. Project Location

City: Ferndale
County: Whatcom
State: Washington
Basin: Nooksack
River: Nooksack River
River Mile: 3.5 to 5.7
River Bank: Left (see map, Appendix B)

Additional information
REPORT PURPOSE: This report provides pertinent information regarding the project, the repair plan, estimated quantities, costs and benefit ratios to restore the existing levees to pre-flood condition. Due to the dynamic process of rivers, damages induced by rivers on levees and other structures continuously changes. Information including project description, final repair actions contained within this document are subject to change without notice prior to and during construction.

5. Project Design

This non-federal rural levee was constructed to provide flood control protection from the Nooksack River near Ferndale in Whatcom County, Washington. The levee is approximately 12,000 LF in length and is 6 to 8 feet high on the landward side; landward slopes are typically 5H:1V. The top width is 10 to 12 ft. The riverward slope is typically 2H:1V. The levee is predominantly composed of compact local borrow material. The levee has armor slope erosion protection along the riverbank. Between the levee and the

river, there is typically a vegetated bench of varying width. The levee is designed to provide 15-year level of protection.

6. Disaster Incident

Between 7 and 10 January 2009, heavy rains and warm winds of subtropical origin, antecedent low elevation snow and ice, and a series of high tides contributed to moderate to severe flooding in the Nooksack River valley, with damages from the headwaters to the river delta. A 15-year flood event occurred at the Cedarville gage, which increased in magnitude in the downstream direction until reaching a 27-year recurrence interval at Ferndale. For more information on the flood event, see Seattle District's EngLink Situation Reports for flood event #3, January 2009.

7. Project Damages

High flows during the January 2009 flood event caused damage in two general locations. At Site 1, flood flows scoured approximately 200 LF of the toe and slope protection, and when the levee overtopped, caused back slope scour and loss of embankment. Scour has removed half of the riverward levee prism. Damage at Site 2 occurred along the downstream 2400 LF section which experienced backslope scouring from river overtopping at six (6) locations totaling 700 LF, with segment lengths varying from 60 – 240 LF. In the current condition, the levee offers 2-year flood protection.

8. Project Performance Data

A continuing eligibility levee inspection was performed in October 2003. The levee was found to be in acceptable condition. The sponsor expends approximately $2000 in annual maintenance for this levee. The level of maintenance is consistent with Seattle District recommendations.

Inspection Results.
(1) Date of last inspection: October 2003
(2) Type of last inspection: CEI
(3) Project condition code of last inspection: Acceptable
(4) Status: Eligible
Sponsor's Annual O&M Costs: $2,000
Estimated Cost to Repair Maintenance Deficiencies: N/A

9. Project Alternatives Considered

Multiple alternatives were considered including the No-Action, Repair In-Kind, Setback and Non-Structural alternatives. At this stage in the project, a preliminary analysis has been performed on the following alternatives:

No Action Alternative
The No-Action alternative would leave the levee in its current damaged condition. This alternative was not considered further because of the high potential of flood damages to farmland and infrastructure.

Non-Structural Alternative
This alternative would relocate all existing structures, utilities and other infrastructure within the damage area protected by this section of levee. This was not a viable alternative. The costs associated with this alternative were deemed too high for the level of benefit associated with this alternative.

Repair In-Kind Alternative
This alternative was evaluated and is the least cost alternative. Repairs at Site 1 would consist of a 6' x 12' class V weighted toe and a 3' blanket of class IV rip rap for approximately 200 LF. Re-grading and re-sloping of the damaged levee would be required. The levee would have a 12' top width and backslope of 5H:1V. Repairs at Site 2 would consist of back slope filling and re-grading along 2400 LF of levee for a total of 700 LF in six different locations. This alternative does not meet the Sponsor's goals.

Setback Levee Alternative
This alternative was evaluated and is the locally preferred and recommended alternative. Setting the levee back is consistent with the county's long range goals of opening up the floodplain in the reach and reducing the amount of armor rock required along the riverbank. The setback alternative would reduce the long term maintenance commitment at this site and potentially reduce the transmission of flood scour to nearby levee sections. It would also provide environmental benefits, providing room for natural habitat development. The setback would start at the upstream end of the damaged section at Site 1 and continue downstream for 940 LF. A buried toe trench is required for the first 300 LF of levee where the setback levee transitions into the setback. This will insure that the upstream section does not erode. Repairs at Site 2 would be the same as the Repair In-Kind alternative. (See Recommended Alternative below for more detailed description).

10. Recommended Alternative:

A selection of a recommended alternative was made: the setback levee alternative. This alternative sets back the levee for 940 LF and 700 LF of repair of the levee crown and back slope damage. This alternative is considered to be a betterment. Per ER 500-1-1, the sponsor is responsible for all costs in excess of the least-cost alternative (Repair In-Kind). Therefore, two sets of drawings and cost estimates were prepared: one for the Repair In-Kind alternative and another for the Setback alternative. Drawings, maps, and other pertinent design information are located are in Appendix B.

The recommended plan consists of constructing a new levee for approximately 940 LF at Site 1, realigning the levee landward behind the existing levee and installing a rock toe trench along the first 300 LF. The existing damaged levee section will be regraded to 6H:1V slope, planted and hydro seeded with native grasses for 300 LF. This will help to stabilize the existing river bank in this section. Excavated material will be utilized to rebuild the setback levee as much as possible. Additional granular fill material will be imported. The new levee section will have a 3H:1V riverward face and a 5H:1V back slope with a 12 foot top width.

Repairs at Site 2 would consist of back slope filling and re-grading along 2400 LF of levee for a total of 700 LF in six different locations. Each site will be regraded and new granular fill material will be placed to re-establish the pre-flood conditions.

Access will be along the existing top of levee. Both sites will be hydro seeded with native grasses when construction is complete. Confirmation of the design, including additional NEPA/ESA required features, will occur during the NEPA process and before construction.

11. Lands, Easements, Rights-of-Way, Relocations, and Disposal areas (LERRD)

The Hovander Park Levee Rehabilitation is located on the left bank of the Nooksack River in Section 32, Township 39 North, Range 2 East, Willamette Meridian, in Whatcom County, Washington. The proposed Rehabilitation will affect approximately 1,640 total linear feet of levee. Acquisition of additional perpetual property interests will be required if the proposed Rehabilitation footprint exceeds the area covered by the Sponsor's existing perpetual levee easements, or if the existing easements do not provide the required interests in project lands.

In order to proceed with the Rehabilitation the Sponsor must make the required levee project lands available prior to solicitation for the construction contract. See the proposed project schedule under Section 15 of this report.

To meet the real estate requirements for the Rehabilitation, the Sponsor will need to demonstrate that it has the real property interests listed below:

PERPETUAL FLOOD PROTECTION LEVEE EASEMENT ESTATE
A perpetual and assignable right and easement in the land delineated on the attached location map, Exhibit A, by this reference made a part hereof, to construct, maintain, repair, operate, patrol and replace a flood protection levee, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired.

Proposed access (both ingress and egress) to the Rehabilitation site is available from Neilsen Road (public road) to the County park facility (See project map). The Sponsor will need to demonstrate that it has the below real property interests for perpetual access to the levee easement footprint from the Neilsen Road right-of-way to the levee easement footprint.

PERPETUAL ROAD EASEMENT
A perpetual and assignable easement and right-of-way in, on, over and across the land delineated on the attached location map, Exhibit A, for the location, construction, operation, maintenance, alteration and replacement of (a) road(s) and appurtenances thereto; together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the grantors, their heirs and assigns, the right to cross over or under the right-of-way as access to their adjoining land; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

Construction staging will occur within the perpetual levee easement footprint. If it is later determined that a temporary construction staging area, or temporary access road is required for construction, the Sponsor will need to demonstrate that it has the below real property interests for those areas.

TEMPORARY WORK AREA EASEMENT
A temporary easement and right-of-way in, on, over, and across the land delineated on the attached location map, Exhibit A, for a period not to exceed six (6) months, beginning with date possession of the land is granted to the Grantee for use by the United States, its representatives, agents, and contractors as a work area, including the right to deposit fill material thereon, move, store, and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Hovander Park Levee Project Rehabilitation Effort, Job No. NSK-3-09, together with the right to trim, cut, fell, and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads.

The final location of temporary access routes and temporary disposal sites will be determined in the next project phase – E&D. Additionally, if the COE, Real Estate Division determines the Sponsor does not have adequate real property interests for the lands needed for the proposed Rehabilitation, including additional damage not visible at the time of inspection because of the presence of vegetation, then acquisition of property interests may be necessary. The need for the Sponsor to acquire or cure its existing property interests could result in further delay of repairing the damaged levee as proposed in the project schedule – see Section 15 of this report.

As part of the land certification process for the Rehabilitation, the Sponsor will need to provide title reports not more than 90 days-old at the time of land certification demonstrating its real property interests in the lands required for the proposed levee repairs.

12. Economic Evaluation

This levee has been classified as a non-federal rural levee in the PL 84-99 program. In its current damaged, or without-project condition, it provides protection from flooding for up to a 2-year event.

The economic evaluation was conducted in accordance with EP 500-1-1 and ER 500-1-1. Costs are annualized over the project period of analysis at the current federal interest rate of 4.625%. Benefits are based on the expected flood damages prevented as a result of the project. In accordance with EP 500-1-1, the maximum period of analysis for a non-federal agricultural levee is 10 years. For all other levees, the period of analysis is the shortest of the following time periods:

(1) With-project level of protection (15 years);
(2) Fifty years; or
(3) Remaining life of the project (50 years).

The period of analysis for the Hovander Park levee is therefore 15 years.

There are approximately 965 acres (1.5 square miles) of wetlands owned and operated by the Department of Fish and Wildlife as a natural area in the floodplain behind the Hovander Park levee. The most important function of the levee is to protect Slater Road, which is about three quarters of a mile downstream of Hovander Park. Further downstream in the Hovander Park levee floodplain is Marine Drive and the small town of Marietta.

Slater Road provides access to one of two main routes to the small peninsula of relatively high ground in the Nooksack River delta into Bellingham Bay. This peninsula is situated within the Lummi Nation Tribal Reservation. At the tip of the peninsula is the ferry terminal to Lummi Island. Lummi Island is one of the San Juan Islands. According to a 2007 Whatcom County Public Works Ferry Division report, the ferry serves Lummi Island residents, visitors, and businesses, having transported over 222,500 passengers during 2007. This same period has seen vehicle or passenger car trips of 124,623, and total vehicles transported of 128,891. Ridership shows strong seasonal variations. July and August remain the busiest months with over 10% of all vehicle and pedestrian trips occurring in each of these months. The permanent resident population is over 900 and during the summer swells to over 2,000.

There are two routes to the ferry and to the Lummi Nation tribal land that run along the shoreline either on the north shore via Slater Road to Haxton Way or via Marine Drive to Lummi Shore Road on the south side of the peninsula.

When the Hovander Park levee is breached or overtopped, Slater Road and Marine Drive are typically inundated with flood waters and closed. Marine Drive is also flooded by other sources. When Slater Road is closed, the designated detour route of approximately 3.4 miles is through the center of the city of Ferndale on Main Street, a couple of miles north of Slater Road. This increases the traffic on Main Street in Ferndale by about 70%, resulting in severe traffic congestion in Ferndale with an average delay of 40 minutes observed by Whatcom County Public Works personnel. The closure and resulting detour imposes additional operating costs for the extra mileage and the opportunity costs of time to the residents of the city and those commuting to the Lummi Nation and Lummi Island.

The opportunity cost of time benefits were estimated in accordance with ER 1105-2-100, Appendix D using traffic count data and time delays provided by the county along with national and regional demographic statistics. The average duration for the road closures is about two days. Table 1 below shows the estimated costs for a two-day closure of Slater Road. This does not include additional costs imposed on the residents and businesses of the City of Ferndale.

Table 1

Slator Road Detour Costs	Cost for 2-day closure
Value of Time (Opportunity Costs)	$ 267,042
Vehicle Operating Costs	$ 39,305
Total	**$ 306,348**

Restoring the Hovander Park levee to it 15-year level of protection will reduce the frequency of Slater Road closures and the resulting costly detours. Table 2 below shows the with- and without-project expected annual damages (EAD) and benefits. With-project annual benefits are converted to expected annual damages reduced, or EAD reduced, andare about $87,000. Note that the EAD was calculated using trapezoidal integration of expected damages up to a 15-year event.

Table 2

With- and Without-Project Expected Damages			
Level of Protection	**Without-Project Expected Damage**	**With-Project Expected Damage**	**Benefits - Expected Damages Reduced**
2-year	$ -	$ -	$ -
5-year	$ 306,347.53	$ -	$ 306,347.53
15-year	$ 306,347.53	$ -	$ 306,347.53
EAD	**$ 107,222**	**$ 20,423**	**$ 86,798**

The total estimated project costs to restore 15-year protection to the Hovander Park levee are $295,000. Table 3 displays the rounded project costs, annualized costs, and resulting benefit-cost ratio (BCR).

Table 3

Annualized Costs and Benefit-Cost Ratio	
First Cost	**$295,000**
Annual Cost	
Interest and Amortization (15 years@4.625%)	$28,000
O&M[1]	$2,000
Total Annual Cost	**$30,000**
Annual Benefits	$87,000
Benefit-Cost Ratio (BCR)	**2.9 to 1**

[1] A detailed breakdown of the operation and maintenance costs for each levee is not available, but $2,000 per levee per year is a generally accepted estimate.

Distribution of project benefits
The Hovander Park levee protects access to the Lummi Nation, Lummi Island and, indirectly, the City of Ferndale. No individual receives more than 25% of the benefits.

There are at least 965 acres in the flood plain that have a value of at least $1,000 to $2,000 per acre, plus roads and the services that the roads provide. It is reasonable to assume a minimal valuation of at least $1 million in property protected.

1. Total estimated value of property

Land	$1,000,000
Buildings (No structure damages claimed)	$ -

Check #1 is affirmative - First Cost of levee rehab is significantly less than the total value of property protected.

2. Value of cropland - N/A
3. Net Farm Income per acre – N/A

13. Environmental

The damaged levee is located in a natural area adjacent to an open field. In the project area the Nooksack River is a confined, single channel, low gradient system. The preferred alternative includes two repair sites. Site 1 entails setting the levee back from the upstream extent of the project across the adjoining field. That would not require in-water work. Qualified wetland biologists will verify whether other wetlands are present along the setback levee alignment. Site 2 would repair scouring that occurred in six (6) separate places on the back slope over 700 LF of levee just downstream of the setback tie-in. The area where the scour occurred is a wetland, so care must be taken to ensure the footprint of the repair at Site 2 is no greater than the existing levee footprint. Best management practices (BMPs) such as fencing around the wetland may be necessary to avoid impacts to the wetland.

Potential Issues:

a. Water Quality. There is likely to be no in-water work, but care will need to be taken next to the river to control runoff and prevent sedimentation.

b. Fish and Wildlife. The river provides migration, spawning and rearing for all salmonid species utilizing the lower mainstem Nooksack. These species include Chinook, pink, chum, steelhead and large numbers of coho, as well as bull trout. Bull trout, Chinook and steelhead are listed as threatened under the Endangered Species Act, so are resources of concern for this project. The Nooksack in the project reach is part of Chinook salmon critical habitat and bull trout critical habitat. Winter steelhead spawning occurs upstream of the project site. Chum and coho spawn in the project reach. The timing of levee construction may be limited to 15 June to 31 August (odd years due to pink salmon migration) for any in-water work, if that is necessary, but the intent is to avoid in-water work.

The following threatened species are expected to be found in the project area:

- Puget Sound Chinook salmon (and its designated critical habitat),
- Puget Sound steelhead, and
- Coastal/Puget Sound bull trout.

It is anticipated that marbled murrelet, listed as threatened, could transit the area while traveling between nesting areas in the upper watershed, and feeding areas in Puget Sound. Potential effects of the proposed work on threatened or endangered species and designated critical habitat will be addressed per Section 7

of the Endangered Species Act. Bald eagles may be present at the project site. These birds have been removed from the Endangered Species Act but remain protected under the Bald and Golden Eagle Protection Act so caution will be taken to avoid significant harm to the birds or their habitat. Canada lynx, gray wolf, grizzly bear and northern spotted owl are other ESA-listed species that may be found in Whatcom County, but because of specialized habitat requirements and/or lack of tolerance for human activity, they are not likely to be found in the project area, so are unlikely to be affected.

c. Wetlands. Construction activities will be done so as to avoid any impacts to wetlands, which are considered waters of the U.S. A wetland area is present at the downstream end of the Site 1 where the back side of the levee was scoured going eastward from the western boundary (a foot trail) of Hovander Homestead Park. Qualified wetland biologists will verify whether other wetlands are present along the setback levee alignment (Site 1); at the least, the tie-in point with the existing levee bears evaluation. Site 2 repairs are planned to stay within the existing levee footprint; if all work in wetlands at Site 2 is such that there is no change to the character, scope or size of the existing levee, then no evaluation under Sec. 404 of the Clean Water Act is necessary, nor is a water quality certification under Sec. 401 of the Clean Water Act.

d. Navigable Waters. Portions of this site may be below MHHW (i.e., tidally influenced) and therefore subject to Sec. 10 of the Rivers and Harbors Act. A determination of Sec. 10 jurisdiction and site elevations where temporary fill would occur may be necessary.

e. Historic Properties Considerations. A search of the Washington State Department of Archaeology and Historic Preservation (DAHP) database was conducted on 20 February 2009 to identify any potential archaeological, National Register, or State Historical sites in the vicinity of the levee damage sites. The nearest recorded sites are within one mile of the project area.

Prior to repairs, a Corps archeologist will conduct a cultural resources survey of the project area to determine whether there is a potential for the proposed repairs to cause effects to historic properties. National Historic Preservation Act Section 106 compliance reports will be prepared for all proposed 2009 levee repairs. The report will include the findings of the investigations for each repair site, recommendations for archaeological monitoring during construction, and a determination of effects to archaeological and historic properties. If archaeological monitoring is recommended at some repair locations, the report will include a monitoring plan and protocols to be followed. The protocols will include an inadvertent discovery clause that will apply when an archaeological monitor is not present. The Corps' determinations of effects to historic properties, the investigation report, and monitoring plan will be reviewed and approved by the Washington State Historic Preservation Officer (SHPO) and the appropriate tribes prior to construction.

f. Recreation. Visitation in the western part of Hovander Homestead Park will be temporarily disrupted during construction. Wildlife viewing will likely be disrupted.

g. Cumulative Effects. Cumulative effects will be addressed as required under NEPA and ESA.

h. Coordination. The proposed work is formally coordinated throughout the planning, design, and construction phases with the following agencies:

(1) U.S. Fish and Wildlife Service;
(2) NOAA Fisheries;
(3) Environmental Protection Agency;
(4) Washington Department of Fish and Wildlife;
(5) Washington Department of Ecology;
(6) Nooksack Tribe;
(7) Lummi Tribe; and

(8) State Historic Preservation Office.

Their recommendations will be considered and implemented as appropriate.

The design will be coordinated with and reviewed by the above listed agencies. In accordance with ER 200-2-2, Procedures for Implementing NEPA, paragraph 8, Emergency Actions, the environmental effects of the proposed levee rehabilitation will be considered during the planning process. An environmental assessment (EA) will be prepared to evaluate probable impacts of the project on the existing environment. Factors addressed by the evaluation include public safety, water quality, wetlands, threatened and endangered species, noise, economics, fish, and wildlife. The EA will be coordinated with applicable Federal and State resource agencies. The NEPA process will be concluded pursuant to requirements in ER 200-2-2. In addition, requirements for compliance with the Endangered Species Act will be completed. According to Title 33 Code of Federal Regulations, Section 323.4(a)(2), emergency reconstruction of recently damaged parts of levees does not require a Section 404 evaluation provided that the work does not include any modification that changes the character, scope, or size of the original fill design. The proposed repair includes a setback (Site 1) along a new alignment, and backslope repair (Site 2) along the original levee alignment. Repairs at Site 1 may require a Section 404 evaluation if the new levee footprint is found to include wetlands (not apparent during initial site visit, but qualified wetland biologists will verify). Repairs at Site 2 will not require a Section 404 evaluation as long as long as the footprint of the levee repair that falls within water of the United States is no larger than the pre-damage footprint. If a Section 404 evaluation is not required, a Section 401 water quality certification from the Washington Department of Ecology would not be required. This project will require a determination of consistency with state and county shoreline management plans pursuant to the Coastal Zone Management Act.

NEPA documentation is anticipated to finish approximately 84 days after the project begins.

i. Environmental enhancement features. Project construction may include environmental enhancement features to offset temporary construction impacts. Environmental features proposed by agencies will be fully engineered and reviewed during E&D. The setback plan is preferred because it would negate the need for any in-water work. It should allow some river channel migration, as well as reestablishment of riparian vegetation and function. Willow planting and hydroseeding with native grasses will occur along the bank. If the levee footprint is not expanded for construction or other reasons, then no additional environmental enhancement features should be required.

14. Interagency Levee Task Force

HQUSACE has not directed activation of an Interagency Levee Task Force for the flood event associated with the January 2009 flood event in Western Washington. However, informal coordination with FEMA is ongoing.

15. Project Management

a. Funding Authority
(1) Program and Appropriation: FC&CE 3125
(2) Project Funding Class: 320
(3) Project CWIS Number: 322415

b. Project Funds: Project Cost Estimate at March 2009 Price Level
Two cost estimates are presented, one each for the Repair In-Kind (the NED plan) and Setback alternatives.

(1) Cost Estimate - Repair In-Kind Alternative (Least-Cost Alternative/NED Plan)

Equipment	$43,000
Material	$197,000
Subtotal Construction Cost	**$240,000**
Supervision & Administration (6% of construction subtotal)	$14,000
Contingency (10% of construction subtotal)	$24,000
Total Construction Cost	**$278,000**
Engineering & Design (6% of total construction)	$17,000
Total Project Cost	**$295,000**
FEDERAL Share (80% of Total Construction + E&D)	**$239,000**
SPONSOR Share (20% of Total Construction)	**$56,000**

(2) Cost Estimate - Setback Alternative (Recommended and Locally Preferred Alternative)

Equipment	$151,000
Material	$219,000
Subtotal Construction Cost	**$370,000**
Supervision & Administration (6% of construction subtotal)	$22,000
Contingency (10% of construction subtotal)	$37,000
Total Construction Cost	**$429,000**
Engineering & Design (6% of total construction)	$26,000
Total Project Cost	**$455,000**
FEDERAL Share (80% of Total Construction of Least-Cost Alternative + E&D)	**$248,000**
SPONSOR Share (20% of Total Construction of Least-Cost Alternative + Betterments)	**$207,000**

c. Project Repair Schedule

The Work Window (work allowed in the water) is 15 June to 31 August (odd years due to pink salmon migration). Work performed outside this window will only consist of work that is not in the water.

Table 4 - Project Repair Schedule

RESPONSIBLE PARTY	MILESTONE TASKS	MILESTONE DATE
COE	PIR Approval	27 April 2009
COE	E&D complete	1 June 2009
COE	CA and LER Cert Documents to Public Sponsor, and Designs for Review NLT	20 May 2009
Public Sponsor	Public Sponsor signs CA	31 May 2009
COE	Environmental Documentation	1 June 2009
COE	DE signs CA	3 June 2009
Public Sponsor	Public Sponsor certifies lands	8 June 2009
Public Sponsor	Public Sponsor provides cash contribution	17 June 2009
COE	RE Division Certifies Lands Available	8 July 2009
COE	Solicit contractors	9 July 2009
COE	Initiate (rental equipment) construction	30 July 2009
COE	Complete Construction	28 September 2009

d. Project Authentication

Project Management .....Lester Soule .....(206) 764-3514
Emergency Management approval .....Paul Komoroske.....(206) 764-3406

e. Technical Points of Contact

Emergency Management .....Doug Weber.....(206) 764-3406
Economics.....Don Bisbee.....(206) 764-3713
Environmental .....Jeff Dillon .....(206) 764-6174
Jeff Laufle.....(206) 764-6578
Cultural Resources.....Kat Kelly.....(206) 764-7857
Engineering and Design.....Cathie Desjardin.....(206) 764-3542
Program Management.....Doug Weber.....(206) 764-3406
Real Estate .....Kevin Kane .....(206) 764-6652
Hydraulics and Hydrology.....Zac Corum .....(206) 764-6581

APPENDICES
Appendix A: Project Sponsor's request for Rehabilitation Assistance

WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT
FRANK M. ABART
Director

RIVER AND FLOOD
322 N. Commercial Street, Suite 120
Bellingham, WA 98225
Phone: (360) 676-6876, (360) 398-1310
Fax: (360) 738-2468
www.whatcomcounty.us

February 6, 2009

Doug Weber
US Army Corps of Engineers
P.O. Box C-3755
4735 E. Marginal Way S.
Seattle, WA 98124-2255

Re: Levee Repair Work in Whatcom County

Dear Mr. Weber:

During the recent January flood event in Whatcom County there were multiple levee segments that were damaged. They include the following:

- The Guide-Meridian Levee – two breaches, both approximately 100-ft. on this levee segment south of B/C Avenue.
- The Bylsma Levee – an approximately 75-ft. section of this levee was damaged near Bylsma Road.
- The River Road Levee – an approximately 150-ft. section of this levee was breached adjacent to River Road. In addition, multiple sections of this levee in the vicinity of the breach experienced significant seepage thru the levee prism.
- Hovander Park Levee – an approximately 150-ft. section of this levee near Hovander Park was damaged, with significant erosion on the face of the levee. In addition, there are multiple locations of backslope damage throughout the levee segment.
- Rainbow Slough Levee – multiple breaches of this levee near the downstream end of the levee segment.

We are requesting ACOE assistance under the PL84-99 Program in implementing a repair project at this location. Whatcom County will act as the local sponsor and provide all necessary lands, rights-of-way, and easements for this project.

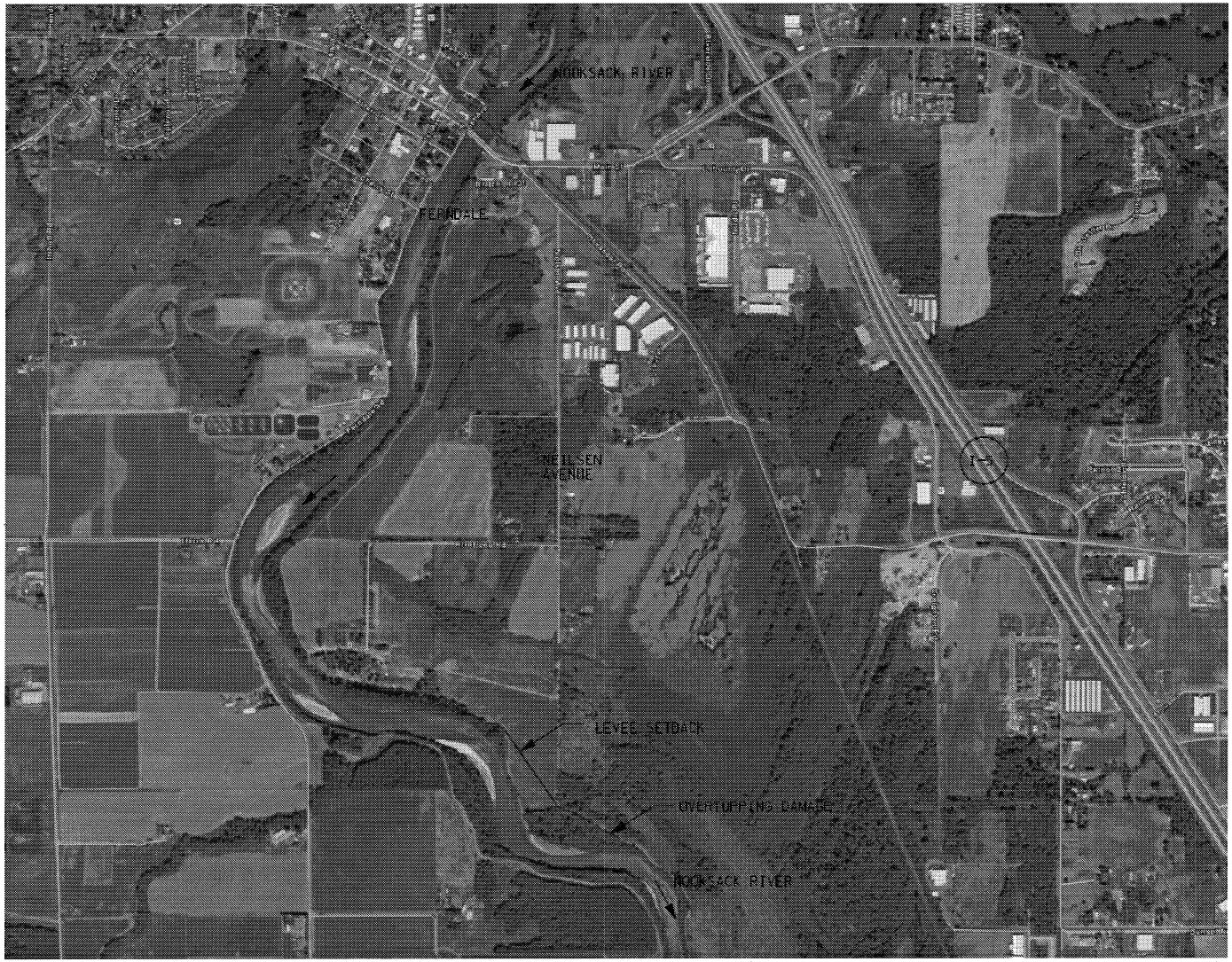
If you have any questions or need any additional information please contact me at (360) 676-6876.

Sincerely,

James E. Lee, P.E,
River and Flood Engineer

I:\FLOOD\112 - General Flood Works (Projects)\R & M Proj\2009\ACOE Levee Repairs\ACOE Request Letter (020609).docx

Appendix B: Project location and design data, maps, and related information



(Google Earth 2007: Annotated by Corps, 2009)

Whatcom County, WA: Section 32, Township 39 North, Range 2 East, Willamette Meridian

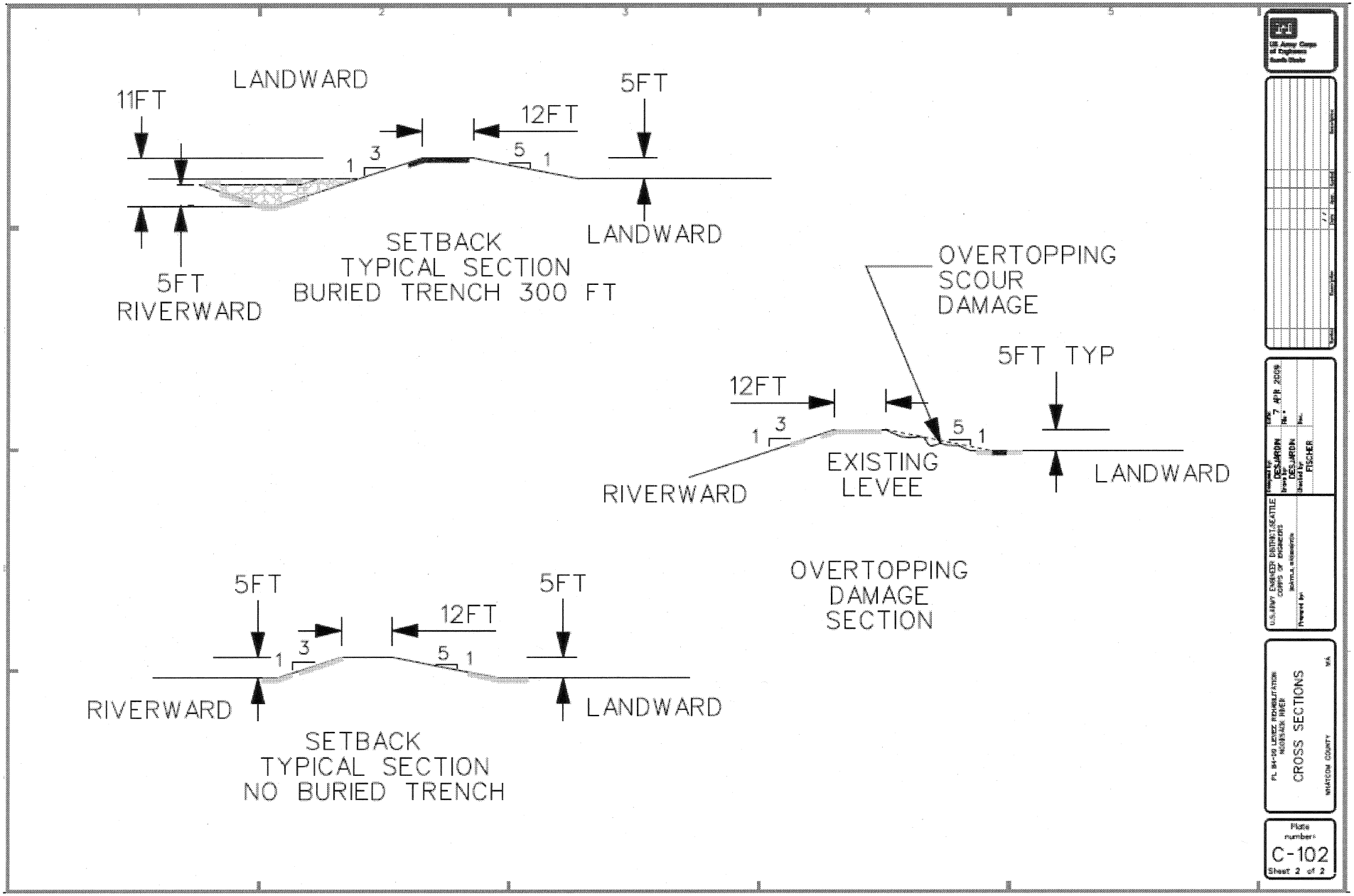
NOTES:

1. SETBACK LEVEE IS PREFERRED ALTERNATIVE
2. UPSTREAM 300' OF SETBACK LEVEE WILL HAVE BURIED TOE.
3. BACKSLOPE DAMAGE ALONG 600' DOWNSTREAM END.

PLAN NORTH

PL 84-99 LEVEE REHABILITATION
NOOKSACK RIVER
HOVANDER PARK LEVEE
PLAN VIEW
WHATCOM COUNTY WA

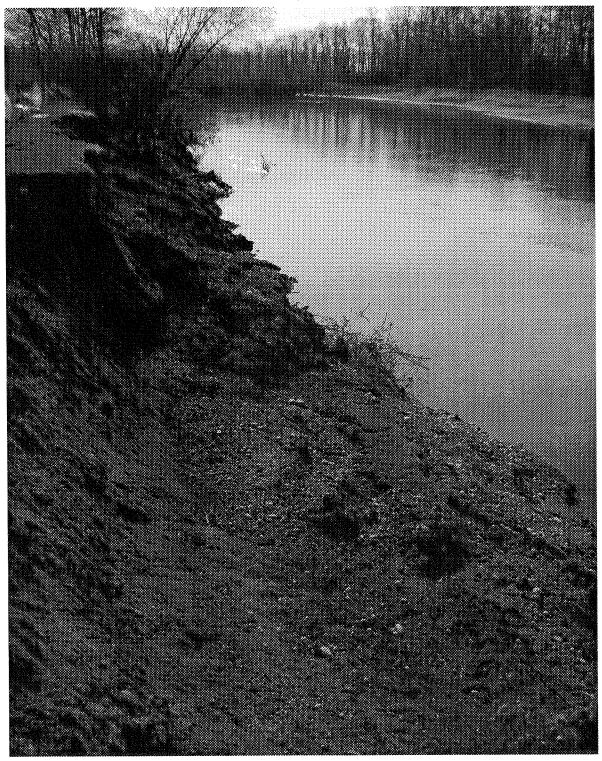
Plate number: C-101
Sheet 1 of 2


LANDWARD
11FT
5FT
12FT
3
1
5
1
5FT
RIVERWARD
LANDWARD
SETBACK
TYPICAL SECTION
BURIED TRENCH 300 FT
OVERTOPPING
SCOUR
DAMAGE
5FT TYP
12FT
3
1
5
1
RIVERWARD
EXISTING
LEVEE
LANDWARD
OVERTOPPING
DAMAGE
SECTION
5FT
5FT
12FT
3
1
5
1
RIVERWARD
LANDWARD
SETBACK
TYPICAL SECTION
NO BURIED TRENCH
CROSS SECTIONS
C-102
Sheet 2 of 2

Appendix D: Damages

Photo 1 – Photo looking downstream along scoured levee (this section to be set back)

Photo 2 - Photo looking downstream along scoured levee (this section to be set back)



Appendix Z: PIR Review Checklist

EP 500-1-1
30 Sep 01

Hovander Park Levee - NSK-3-09

PIR Review Checklist for FCW Rehabilitation Projects

	YES	NO	N/A	
1.	X	___		The project is active in the RIP. [ER, 5-2.a.]
2.	X	___		The project was damaged by flood(s) or coastal storm(s). [ER, 5-2.]
3.	X	___		The Public Sponsor has requested Rehabilitation Assistance in writing. [EP, 5-10.b.]
4.	X	___		The Public Sponsor has agreed to sign the Cooperation Agreement, which will occur before USACE begins rehabilitation work. [ER, 5-10.]
5.	X	___		The estimated construction cost of the rehabilitation is greater than $15,000, and is not considered sponsor maintenance. [ER, 5-2.q.]
6.	X	___		The repair option selected is the option that is the least cost to the Federal government, or, the sponsor's preferred alternative is selected with all increases in cost paid by the public sponsor. PIR includes justification for non-select of the least cost alternative. [ER, 5-2.h. and 5-11.e.(3)]
7.	X	___		The public sponsor is aware of the opportunity to seek a nonstructural alternative project, and has decided to proceed with a structural rehabilitation. [ER, 5-16]
8.	X	___	___	The cost estimate in the PIR itemized the work to identify the Public Sponsor's cost share. [ER, 5-11]
9.	X	___		The rehabilitation project has a favorable benefit cost ratio of greater than 1.0:1. [ER, 5-2.r.]
10.	X	___		The proposed work will not modify the FCW to increase the degree of protection or capacity, or to provide protection to a larger area. [ER, 5-2.n.]
11.	X	___	___	Betterments are paid 100 percent by the Public Sponsor. [5-2.o.]
12.	X	___	___	The CA contains a provision for 80% Federal and 20% local cost share for non-Federal projects. [ER, 5-11.a.]
13.	X	___	___	Cost for any betterments are identified separately in the cost estimate. [ER, 5-2.o.]

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FIGURE 5-4. PIR Review Checklist (Appendix Z) for FCW Rehabilitation Projects

PIR Review Checklist for FCW Rehabilitation Projects (Continued)

	YES	NO	N/A	
14.	___	___	N/A	Repair of deliberate levee cuts is the responsibility of the public sponsor, except as provided for in ER 500-1-1, paragraphs 5-2.j. and 4-3.h. [ER, 5-2.j. and 4-3.h.]
15.	X	___		All deficient and deferred maintenance will be paid for or accomplished by the Public Sponsor, without receiving credit toward any sponsor's cost share. [ER, 5-2.g.]
16.	X	___	___	Any relocation of levees is adequately justified. [ER, 5-2.h.]
17.	X	___		USACE assistance does not correct design or construction deficiencies. [ER, 5-12.a.]
18.	X	___		An assessment of environmental requirements was completed. [ER, 5-13., and EP, Figure 5-3, paragraph 12.]
19.	X	___		The project complies with NEPA, and required documentation was completed and placed in Appendix G of the PIR. [ER, 2-3.k.; ER, 5-13.; and EP, Figure 5-3, paragraph 12.] NEPA will be completed in EA
20.	X	___		The Endangered Species Act was appropriately considered. [ER, 5-13.g., and EP, Figure 5-3., paragraph 12.]
21.	X	___		EO 11988 requirements were considered in the process of evaluating the proposed project for rehabilitation. [ER, 5-13.f., and EP, Figure 5-3, paragraph 12.]
22.	X	___		The completed PIR has been reviewed and the PIR Checklist has been reviewed and signed by the Emergency Management Office. [EP, 5-11.a.(3)(a)]
23.	X	___	___	The completed PIR meets all policy, procedural, content, and formatting requirements of ER 500-1-1 and EP 500-1-1. [ER, 2-3.b.]

EM REVIEWING OFFICIAL'S SIGNATURE

Dave Wilder

NAME

Dpty Dist Engr

TITLE

TELEPHONE NUMBER (206) 764-3906

Page Z-2